THE HOME MORTGAGE INTEREST DEDUCTION FOR FEDERAL INCOME TAX:

A FEDERALIST PERSPECTIVE

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The debate over federal income tax treatment of home mortgage interest (HMI) has largely overlooked an important, and possibly unintended political and economic consequence of our federal income tax system. The distribution of the for home mortgage interest deduction tax benefit across states is a possible missing consideration. Specifically, this study offers a federalist[1] perspective on the federal income tax benefit from the deduction for HMI - one of the largest personal federal tax expenditures on the books. This dissertation analyzes current national political rhetoric from a federalist perspective. Discussion also includes background, current status, and proposed changes to the tax code for of the HMI deduction.

First, a Tobit regression is used to analyze the distribution of the HMI tax benefit across states and to test for disproportionate distribution across states in benefit derived from the federal income tax deduction for home mortgage interest beyond that which is explained by income. This initial part of the study is also the precursor to a hierarchical

[1]The concept of federalism deals generally with the division of powers between national and regional (state) governments. Under federalism, both levels of government operate simultaneously and exercise power directly over the people representing somewhat of a compromise between the two extreme forms of government (with unitary and confederate structures at the two extremes) in terms of power centralization. In the context of HMI, the federalist view considers the equitable distribution between states of the federal income tax benefit derived from the HMI deduction.

analysis seeking to identify significant factors affecting the distribution of the benefit of the HMI deduction across states. The Ernst and Young/University of Michigan Individual Model File of 1992 tax returns is the primary data source for this initial part of the investigation.

The second part of the analysis examines the effect of sets of factors in a causal hierarchy on the HMI deduction benefit. By first controlling for the effects of personal and identifiable state characteristics on HMI deduction benefit, the possible existence of a residual socio-political force is tested. The primary data sources for this part of the study are the 1990 Census of Population and Housing 5% Public Use Microsample as well as tax data extracted from the Statistics of Income, Individual Public Use Tax File, Level III Sample, as well as others. Ridge regression is used for hypothesis testing.

Results indicate the existence of a significant difference in the benefit from home mortgage interest deduction across states holding income constant. This study also finds that a set of personal as well as a set of state market, legal and tax characteristics significantly influence the taxpayer's HMI deduction benefit, and that a residual difference in benefit across states after controlling for personal and identified state attributes. Future study should examine the source of residual across state differences (attributed to socio-political differences between states). Federal housing goals may be frustrated as the effective subsidy actually helps support higher home prices in areas where high housing costs may already be a barrier to potential new homeownership. The concepts and techniques applied in this study could easily be applied to other provisions of federal tax, or to any other tax system in a federation for that matter.

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CHAPTER I

INTRODUCTION

This dissertation contributes to the federal income tax debate by bringing to light the consequences of the tax laws and regulations under which our economic system operates. Specifically, this study offers a federalist perspective on one of the largest personal federal tax expenditures - the deduction for home mortgage interest (HMI). Discussion also includes background, current status, and proposed changes to the tax code for of the (HMI) deduction.

This dissertation analyzes current national political rhetoric from a federalist perspective (i.e., with consideration given to the right of states to equal treatment). The distribution of the HMI deduction tax benefit between states is introduced here as a possible missing consideration in the national level political debate that dominates current discussion of the HMI deduction.

There are two main parts to the empirical analysis. First, a Tobit regression is used to analyze the distribution of the home mortgage interest (HMI) tax benefit across states and to test for disproportionate distribution across states. The focus of this first part of the study is on answering the question of whether there is a difference between states in terms of the benefit derived from the federal income tax deduction for home mortgage interest beyond that which is explained by income. This initial part of the study is the precursor to a hierarchical analysis seeking to identify significant factors affecting the distribution of the benefit of the HMI deduction across states. The primary data source is the Ernst and Young/University of Michigan Individual Model File of 1992 tax returns.

The second part of the analysis examines the effect of sets of factors in a causal hierarchy on the HMI deduction benefit. By first controlling for the effects of personal and identifiable state characteristics on HMI deduction benefit, the possible existence of a residual socio-political force is tested. The primary data sources are the 1990 Census of Population and Housing (U.S. Department of Commerce 1993) 5% Public Use Microsample (PUMS) as well as 1989 tax data extracted from the Statistics of Income, Individual Public Use Tax File, Level III Sample. Other sources include the Federal Housing Finance Board (FHFB), Mortgage Bankers of America (MBA), U.S. Department of Housing and Urban Development (HUD), and Bureau of Census, Statistical Abstracts. Hypothesis testing is conducted with the use of a Ridge regression analysis.

The primary purpose of this research is to identify the possible existence of a wealth transfer between states. Once identified, public finance theory should be applied to the normative issue of desirability of such redistribution (as future research). At a simplistic level, the equity argument against wealth transfers is understandable. From the standpoint of national housing policy, however, the issue is further complicated by the likelihood that if a transfer exists, resources are probably flowing from low cost of housing states to those where housing costs are high. In this case, the transfer, as a subsidy of higher priced homes, compounds problems related to cost of home ownership. Thus, federal housing goals may actually be frustrated as the effective subsidy actually helps

support even higher home prices in areas where high housing costs may already be a barrier to potential new home ownership.

Despite some controversy over what should or should not be termed a tax expenditure, most of the items on the official tax expenditure lists--from mortgage interest deductions to capital gains breaks--are generally agreed to be deviations from fair tax policy that are functionally equivalent to spending programs.

In the current study, owner-occupied housing is accepted as a public good (as suggested by White and Schollaert 1993). Research has shown conclusively that owner occupied housing is at least associated with socially desirable behavior. An example is that children of home owners demonstrate a higher likelihood of finishing high school and a lower likelihood of having children or of being arrested while they are teenagers (Capozza *et al.* 1996).

A primary objective of this study is to answer the question: Is there a difference in the benefit from home mortgage interest deduction across states holding income constant? This study also investigates factors that may contribute to such differences considering the effect of a set of personal as well as a set of state characteristics on the taxpayer s HMI deduction benefit. A potentially important consequence of a difference in HMI deduction benefit across states after controlling for personal attributes of the taxpayer is that the deduction, in effect, could result in an unintended wealth transfer between states. Such a transfer would be contrary to the notion of fiscal federalism, that has seen renewed public interest, primarily among conservatives (such as Newt Gingrich, whose political ideology of this time was influenced by the decentralization theme of

Toffler 1980) led by Ronald Reagan (Williamson 1990).[1]

Even though such interstate transfers have become almost commonplace, Federalists maintain that the national government has no business effecting resource transfers across states without good cause (such as, to protect the national interest). Based on the political unpopularity of regressive wealth transfers generally, it is further unlikely that it would be considered politically desirable, much less an important part of some national strategy, to require lower home price states (that may tend to be poorer overall) to subsidize their higher priced counterparts.

The concepts and techniques applied in this study could easily be applied to other provisions of federal tax, or to any other tax system in a federation for that matter.

[1]Evidence of the objection to a strong central/national government by U.S. conservatives is abundant in the popular press as exemplified by Watkins (1995).

CHAPTER II

LITERATURE/THEORY

2.1 The HMI Deduction for Federal Income Tax

2.1.1 History of the HMI deduction, Current Provisions, and Policy Recommendations

2.1.1.1 History of the HMI Deduction

The HMI deduction has been available to taxpayers as part of a personal interest deduction since 1913 when the 16th amendment to the U.S. Constitution first allowed for an income tax. Limits on the HMI deduction were first introduced on October 13, 1987 (P.L. 100-647). Prior to 1987 the amount of the deduction was unlimited.[1]

One of the (if not the) most serious challenges to the HMI deduction came in the early 1980s when, in fulfilling his mandate to study fundamental tax reform, President Reagan put the longstanding deduction on the table (McLure 1986). Subsequently, in a speech to the National Association of Realtors on May 10, 1984, President Reagan recanted the potential policy change, promising that his 1985 tax reform proposals will not affect home owner tax preferences, including the deduction for mortgage interest (Tax Analysts 1984).

The Tax Reform Act of 1986 (TRA 86), although not directly impacting the HMI deduction, by instituting a phase-out of the itemized deduction for consumer interest, had

[1] An important debate to consider in understanding the original intent of the HMI deduction may be that of the rate structure of the early income tax (i.e., flat v. graduated).

an important effect on the use of mortgage interest (although not reflected in the present study due to blurring in the data set used of information for higher income taxpayers). Having survived (TRA 86), the next and still today the most serious challenge to the HMI deduction comes in the form of flat tax proposals. Early versions of the flat tax were advocated by President Reagan.[2] As the next subsection of this dissertation on the current provision demonstrates, the HMI deduction remains largely intact. The subsection after next on proposed changes in the law, however, reflects the fact that, as far as many are concerned, the HMI deduction is still on the table.

2.1.1.2 Current Provision as of 1997

The only personal interest that is deductible today is that on debt secured by a taxpayer s primary or secondary residence. Internal Revenue Code (IRC) Paragraph 163(h)(3) sets forth the limits for the amount of such deduction: (1) interest paid or accrued on a maximum of $1,000,000 of acquisition indebtedness, or debt otherwise grandfathered in, plus (2) interest on a maximum of $100,000 of home equity debt (3) subject to a cap equal to the market value of the property. Interest on a home equity loan not used to buy, build or improve your home (or second home) is an AMT adjustment.

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[2]Tax Analysts (1985) reported that during a 1985 European trip, President Reagan caught Treasury Department and White House officials who had reviewed the president s speech, as well as aides traveling with Reagan off guard when he commented that the new tax reform and simplification proposal he would submit to Congress would not only cut rates but make them less progressive. The president s statement marked a major change in tax policy or a misuse of the word progressive. (Tax Analysts 1985 citing Anne Swardson, 5-8-85, p. 1; 5-9-85, p. B1.) Meanwhile, others in the press (e.g., *The Wall Street Journal*) reported deteriorating congressional support for tax reform as President Reagan and the Treasury Department opted for several major tax breaks in the revised tax reform package.

An individual whose AGI (Adjusted Gross Income) exceeds $100,000 for tax years beginning after December 31, 1990 (indexed for inflation, $105,250 for 1992, $114,700 for 1995) is required to reduce the amount of allowable itemized deductions by 3% of the excess of AGI over $100,000 (for 1991, the first year in which IRC Section 68 took effect).[3] The reduction cannot exceed 80% of otherwise allowable deductions (excluding deductible medical expenses, investment interest, casualty, theft, and wagering losses). No reduction is required in the case of medical, investment interest, casualty, theft, and wagering losses.

2.1.1.3 Policy Recommendations

Although the purpose of this study is not to analyze the possible effects of policy proposals in this area of the income tax, this subsection discusses proposals to cure the distributional problems with the HMI deduction. Special emphasis is given to the idea of indexing to account for interstate disparities.

2.1.1.3.1 Proposed Changes Regarding Home Mortgage Interest

Recent attention paid to federal tax expenditures including the HMI deduction is understandable given the problem of the size of the national debt. Proposed changes to the current IRC provisions regarding the HMI deduction include: (1) eliminating the

[3]Since Internal Revenue Code Section 68 which provides for the phase out of itemized deductions for higher income taxpayers was first introduced for tax years beginning after December 31, 1990 (RIA, 2000), the effect of this provision is partially lost (primarily for married taxpayers filing jointly) for the 1992 tax year effecting the Individual Model File based portion of this study. Since the phase out was not in effect prior to 1991, this provision has no impact on the Census based analysis where incomes reported are for 1989 (even though Census data are also censored at higher income levels to some degree).

deduction altogether (Hall 1987; Representative Armey s *Freedom and Fairness Restoration Act of 1994*; Congressional Budget Office (CBO) Tax Analysts 1994), (2) reducing the cap on the amount of deduction allowed to interest on the first $500,000[4], or $300,000 of debt (Tax Analysts 1995a, see CBO analysis in Tax Analysts 1994, 1995c and e[5]), or the first $100,000 of mortgage debt (as proposed by Sen. Arlen Specter, R-Pa, see Tax Analysts 1995d), or similarly, the first $12,000 of interest paid (Hall 1987; Tax Analysts 1995c[6]), (3) replacing the present deduction with a credit (Sunley 1977; Hall 1987; Luttman 1988 and Luttman and Spindle 1994 suggesting replacement of all itemized deductions with a single credit), (4) providing some form of rental deduction or

[4]In commenting on the Clinton economic proposal, members of Congress voiced concern over possible changes in the HMI deduction (Tax Analysts 1993).

[5]Johnston (1996) reports that in response to (then Republican Senator from Oregon and chairman of the Senate Finance Committee) Robert Packwood s early 1996 proposal to limit the mortgage interest deduction to interest on the first $300,000 of mortgage debt, the home builders association expressed concern that the cut would fall hardest on California, New York, New Jersey, Connecticut, Maryland, Virginia and Florida because they have three-fourths of all homes valued at $250,000 or more.

America s Community Bankers *et al.* (1995) similarly reply to the same proposed $300,000 cap on eligible debt, that such a policy would be unequally distributed across the nation, with high-cost housing locations such as Hawaii and California and parts of the Northeast experiencing major home price declines. Moreover, if the proposal is adopted without an indexation provision, the share of homes affected will increase over time as home prices rise.

During his failed campaign for the 1996 Republican presidential nomination, Senator Arlen Specter of Pennsylvania suggested not allowing a deduction on mortgage balances above $100,000.

[6]CBO proposal recommends capping the mortgage interest deduction at $12,000 per single return, $ 20,000 per joint return, and $ 10,000 per return for married couples who file separately.

Also, the final report of the Bipartisan Commission on Entitlement and Tax Reform, chaired by J. Robert Kerrey included a recommendation to phase in HMI deduction limits between 1995 and 2000 (Tax Analysts 1995a).

credit (Hall 1987), (5) providing a general housing deduction or credit (Hall 1987), (6) eliminating or limiting the deduction for second homes (Tax Analysts 1993; see CBO proposal in Tax Analysts 1995c and 1995e), and/or (7) taxation of rental value of the home as income under Simpson s definition of income (Pechman 1989). Other possibilities enumerated by America s Community Bankers *et al.* (1995) (most of which are also evaluated by CBO) include limiting the benefit of itemized deductions to 15 percent, as well as including mortgage interest deduction amounts in the calculation of the alternative minimum tax, and replacing itemized deductions with a consumption tax. Finally, the USA Tax System plan of Sens. Pete V. Domenici, R-N.M., and Sam Nunn, D-Ga., retains the deduction entirely (Tax Analysts 1995d).

Republicans running for their party s nomination in the 1996 presidential race were divided on the mortgage-interest deduction. Malcolm S. Forbes, Jr. wanted to eliminate it; Patrick Buchanan wanted to keep it, and Senators Bob Dole and Phil Gramm avoided a hard position.

Astute observers have noted that any radical change in the HMI deduction would probably require some transition. One proposed plan would be to grandfather those who already have mortgages, letting them deduct mortgage interest until they sell their homes or refinance; another possibility would be to phase out the deduction over, say, a decade. Further, one problem with a phase-out is that people with adjustable rate mortgages might see their interest rates fall and reap the benefit of lower rates and a tax deduction.

2.1.1.3.2 Indexing

Finally, although analysis is beyond the scope of the present research, this dissertation proposes that an indexation scheme associated with a lower cap, as alluded to by America s Community Bankers *et al.* (1995) be added to the list of proposed options.

With regard to suggested lowering of the cap on mortgage loans eligible for deduction from the current $1 million, when you begin considering lowering the cap on the HMI deduction you run into the problem of finding a cap that is equitable across states, as lowering the cap on regular mortgages could create significant regional disparities due to the wide range of housing costs. It is interesting to note that cross-location variation in home price is less for lower income households (i.e., most of the variation in average home price probably comes from differences on the upper end of the scale (Weinstein, 1979)). The idea of indexing a cap has precedent in U.S. tax policy (see Kenyon and Kincaid (1991) for detailed discussion of the effects of indexing applied to tax exemption of interest on state and local borrowing). Analysis of such a policy proposal (i.e., an indexed cap on deductible HMI) should be the subject of future research.[7]

2.1.2 Tax Expenditure

The concept of tax expenditure is fundamental to the motivation for this

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[7]Indexing to achieve tax equity objectives has actually taken on two forms: (1) the type of cross-sectional indexing as applied to municipal bond interest (IRC Sec. 103) (discussed above), as well as in the context of federal grants-in-aid (discussed elsewhere in this dissertation), and (2) inflation indexing to account for changes in living costs across time. The second type of indexing is applied to personal income tax brackets other than the 36% bracket and 39.6% bracket (that does not apply until 1993 and later tax years. See IRC Sec. 1(f)), the standard deduction (IRC Sec. 1(f)), the personal exemption (IRC Sec. 151(1)(d)), and the earned income credit (IRC Sec. 32(i)). Although accounting for inflation is certainly possible, cross-sectional (cross-state) indexing is of particular interest in the context of a dramatically lowered HMI deduction cap.

dissertation. Tax expenditure is the official term for a government spending program that is implemented through the tax system. To understand the nature of tax expenditure it is informative to examine the words of the congressional Joint Committee on Taxation:

Special tax provisions are referred to as tax expenditures because they are considered to be analogous to direct outlay programs. . . . Tax expenditures are most similar to those direct spending programs that have no spending limits, and that are available as entitlements. Joint Committee on Taxation, 1994, p. 2. See also Congressional Budget and Impoundment Control Act of 1974 (P.L. 93- 344), sec. 3(a)(3).

Each year, the congressional Joint Tax Committee and the Department of Treasury must report their tax expenditures and estimated costs. These tax expenditure budgets include most tax provisions that are considered by some analysts to be the equivalent of spending programs.[8] The HMI deduction is generally regarded as one such subsidy. Some analysts go so far as to refer to such subsidies as entitlements (CTJ).

2.1.2.1 Redistributive Expenditure

It is reasonable to argue that the deductibility of HMI goes beyond the first time and middle-class home buyers incentive that normally justifies its existence, and that its benefit to the rich fits in the category of tax breaks often referred to as loopholes.

This dissertation further argues that (in agreement with Pace 1996) spending is spending, whether it be through a government appropriation or through a deduction granted in the tax code. Both have the effect of using government funds to subsidize

[8]In other cases, however, an item such as the deduction for property taxes may be regarded on tax policy grounds as an adjustment in computing ability to pay taxes rather than a subsidy.

social behavior and implement public policy.[9] In terms of whether this spending is justified (an issue that is beyond the scope of this dissertation), the nation must carefully consider its priorities.

2.1.2.2 The Nature of the HMI Deduction: Tax or Expenditure?

The purpose of this dissertation is not to take a position on whether the HMI deduction expenditure is justified, but rather to answer the question: Does it redistribute resources from state to state? If the answer is affirmative, is there adequate justification for the federal government to act in such a manner? If it is to be argued that such transfer is based on the power of Congress To lay and collect Taxes, Duties, Imposts and Excises, to pay the Debts and provide for the ... general Welfare of the United States (U.S. Constitution, Article. I. Section. 8. Clause 1), then two important issues must be settled: (1) does the deduction constitute a tax or an expenditure?, and (2) does it actually promote, or provide for the general welfare?

If the HMI deduction is considered a tax (or part of one), then the Sixteenth Amendment applies, and there is no constitutional issue with respect to the provision in question. If this is the case, then the issues of state sovereignty and tax equity are the only bases for investigating the state-to-state transfer aspect of the deduction.

If, on the other hand, it can be maintained that the deduction is actually an expenditure, similar in nature to an appropriation, then, as Pace (1996) and others believe,

[9] Both tax exemptions and tax deductibility are a form of government subsidy that is administered through the tax system. (Pace 1996 citing Regan v. Taxation with Representation, 461 U.S. 540, 544 1988).

in light of the effort to help maintain a balanced federal budget, perhaps Congress should consider putting a stop to such government spending through the tax code on the grounds that wealthy individuals should not be permitted such a generous subsidy.

There is no doubt among legal scholars that Congress has been using the tax code as a vehicle for implementing social policy, but as I am unaware of a rational social or economic policy reason for at least the higher levels of HMI deductibility, one explanation emerges as likely: it must be the strength of the real estate and home finance industry lobbies that keeps Congress from rectifying this injustice. In any case, a large part of the deduction appears to fail the promote the general Welfare constitutional requirement.

Under traditional tax expenditure analysis, whether the deductibility of HMI payments would be termed a tax expenditure (as the term is used in the Budget Reform Act of 1974) would depend on whether or not the expense was considered to be associated with the production of income (Surrey and McDaniels 1976). If the rental value of the home were taxed as income (as under a Haig-Simons definition of income), HMI payments could theoretically be viewed as an ordinary and necessary business expense, and one might argue that the deduction of these payments is necessary to the application of a normal income tax--part of the revenue raising nature of the tax system. However, if you adopt the view that the expense is not ordinary and necessary to the production of income, then its deductibility would constitute a tax expenditure. Under the present definition of income then, it is appropriate to treat the HMI deduction as a tax expenditure rather than an adjustment to gross income in deriving net or taxable income.[10]

2.1.2.3 Size and Income Distribution of the HMI Deduction Expenditure

In terms of the overall budget picture the total of all the items in the tax expenditure budget comes to about $456 billion in fiscal 1995. To put this into perspective, this represents roughly two and a half times the amount of all means-tested, direct spending programs, and almost as much as the government spends on defense and interest on the national debt combined (CTJ). As Table 9 illustrates, the HMI deduction, a close second in size only to the tax benefit from employer paid health benefits, is one of the largest personal expenditures, and ranks as the largest itemized deduction, accounting for over half of all itemized deductions.

2.1.3 Distribution of the HMI Deduction Benefit

Like all subsidies structured as personal tax deductions, HMI write-offs lead to upside-down, or regressive distributional effects. That is, the higher a person s income (and tax bracket), the larger the share of mortgage interest that the government subsidizes. Tables 5 and 6 summarize the cross income distribution of the HMI deduction.

In 1994, the Joint Committee on Taxation estimates that about 27 million tax returns reported a deduction for mortgage interest. That compares to about 63 million home-owning households. Thus, for one reason or another, more than half of all home owners get no tax reduction at all from the mortgage interest deduction. Another 40

[10]Courts have held that tax law is intended to tax only net income, not gross income, and should not be used to promote nontax policy. See Pace (1996) at note 188 for case references.

million or so families rent rather than own, and of course they get no help from the mortgage interest subsidy either. On average, mortgage interest deductions are worth almost $6,000 a year each to taxpayers making more than $200,000, but only $116 a year to families earning between $30,000 and $40,000.

It seems obvious that a $52 billion a year direct government housing subsidy program with such an effects would have no chance at all of being enacted. Nevertheless, the mortgage deduction has been on the books so long and is relied on by so many people, that curtailing it would have to be done slowly and gradually to avoid serious unfairness during the transition.

As expected with most any deduction allowed under a progressive tax structure, one certainty about the HMI deduction is its regressive nature. Not only do higher income households have a higher propensity to own their homes and have more to spend on housing, but they benefit more dollar for dollar from their deductions than their lower income counterparts.[11] Numerous analyses show that the benefit of the deduction is closely and positively correlated with income.[12]

A Tax Analysts (1995d) news release shows what income classes actually claim the HMI deduction. The analysis shows that the largest group taking advantage of the deduction, those earning between $50,000 and $75,000 per year represent over 7.6

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[11]Measuring benefit as a ratio of the dollar amount of tax benefit over the total tax paid serves to control for the effect of the progressive rate structure.

[12]For example, an analysis of tax savings from itemized deductions provided by McIntyre (1995) is found in Table 8, as well as estimated size and distribution of the mortgage interest deduction for 1995, by income class (shown in Table 7).

million taxpayers representing about 69 percent of the total number of taxpayers for that income group. The deduction will reduce this group s taxable income by an estimated $64.4 billion, or an average of $8,389 per taxpayer/home owner within the group. By comparison, even though the number of taxpayers in the $1 million and more income group is small (only 37,402 taxpayers), their estimated average deduction per taxpayer is $43,374. For all 27.4 million taxpayers that will claim the mortgage interest deduction in 1995 (representing almost a quarter of all taxpayers/households), an average deduction of $8,687 for each is expected. The difference between rich and poor is compounded even further when consideration is given to the effect of graduated rate schedules.

Although public attitude on the matter of income redistribution is divided and shifting (see Witte 1985 for detailed discussion) it is probably safe to conclude that some form of government sponsored income redistribution is generally supported. Even in conservative circles, it is agreed that some form of temporary subsidy for the poor, or a social safety net, is acceptable, and that life-cycle redistributions such as Social Security (Menchik 1991) as well as those in favor of the disabled are worthwhile functions of government. Given, in any case, that income redistribution *is* a function of government, arguments as to which level of government should perform the redistribution are inconclusive (Pauly 1972).

Pauley (1972) makes the argument that:

> if the desired level of [social welfare] is lower under a unitary government, this happens because unitary government compels people to make payments for the poor about whom they have no concern [referring to spatially remote poor, e.g., the poor residents of a state other than that of the taxpayer s residence]. Such an arrangement can raise the effective

price to taxpayers of making payments to those poor about whom they are concerned.

What makes the distribution of the HMI deduction particularly interesting is that not only may the issue of cross-state subsidy be possible, but that rather than the rich subsidizing the poor, the poor and middle class subsidize the rich. A possible explanation developed by Inman and Rubinfeld (1996) is that middle and upper income households ... constitute the likely decisive coalition in state politics. In other words, just as it is possible that the wealth transfer effected by the HMI deduction serves the interests of the rich as against the poor, so too it may serve the interests of the residents of certain states as against residents of others.

Susswein[13] (1994) discusses the failure of the traditional tax expenditure budget to treat as tax expenditures the preferential tax rates enjoyed by some individuals under the graduated rate structure. Susswein points out the strange results that follow from the traditional approach, including the fact that lowering tax rates on high-income individuals technically produces a more equitable distribution of tax expenditures. Susswein (1994) recommends adoption of a more comprehensive method of keeping track of income tax provisions intended to implement social or industrial policies such as the HMI deduction.

According to the Susswein article, the root of the distortion problem is in the nature of the tax expenditure budget that was created in 1974 to help Congress understand the policy effects of the income tax. The problem is that the theory behind the tax

[13]Donald B. Susswein served as tax counsel to the Senate Finance Committee from 1981 to 1985.

expenditure budget in its present form fails to take into account the most important social and economic policy embedded in the tax code--that is, the differing rates at which taxpayers are required to pay their income taxes.

Given that incomes vary significantly from state to state (an assertion that can be easily tested), former tax counsel to the Senate Finance Committee (from 1981 to 1985) Donald B. Susswein s (1994) implication for the present study is that a cross-subsidy from lower- to upper-income states should be expected due to the progressive federal income tax rate structure.

The present study analyzes the distribution of the federal tax expenditure for the HMI deduction across states. Assuming that the proceeds from disallowance of the HMI deduction would be distributed among the states either in the form of a reduced national debt, or a general reduction of federal income taxes, winners and losers (i.e., states whose residents pay less than their pro rata share and those who pay more) should emerge under the current distribution scheme.[14] The question of how to measure the benefit of the deduction is addressed in the methodology chapters of this study.

In an effort to keep the analysis as simple as possible, I proceed under the assumption that the present tax structure is acceptable in terms of the distribution of burden of payment (as opposed to economic burden) across income levels of the

[14]Externalities created by an expenditure are beyond the scope of the present study. In this case I consider only the direct tax effect of the expenditure. If other research indicates that housing is a public good, this may justify a government subsidy. Such subsidy should, however, be directed so as to maximize the public benefit. In other words, if it is beneficial to society for someone to own rather than to rent their home, then subsidize that decision. The current HMI deduction is not such a subsidy.

population. Past research has shown quite clearly that the federal tax expenditure to subsidize HMI is skewed in favor of the upper income levels (i.e., is regressive).[15] The focus of the present study is on the distribution of the expenditure across states within income levels, rather than simply across income levels. In other words, a major goal of this dissertation is to examine its distribution across states holding incomes constant.

As an example of the existence of myth in the tax rhetoric, the following quote is attributed to Senator Russell Long: Don t tax you, don t tax me, Tax that fellow behind the tree (Miller 1993, citing George F. Will, Morality and the Martini Lunch. *Newsweek*, Oct. 17, 1977, at 120). In terms of the HMI deduction, one myth is that, as a tax deduction, everyone who qualifies to take the HMI deduction benefits from the policy (it is a sort of free lunch). Therefore, no one should object to it. When viewed as a federal expenditure program, however, the deduction takes on a different complexion. As everyone knows, with any expenditure there is no such thing as a free lunch.[16]

Another common misperception is that the United States enjoys a high rate of home ownership (relative to other industrialized nations), and that this is due to the HMI tax deduction (see Bartlett s 1996 counter to this argument, also in subchapter 2.2 of this

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[15]Aaron (1972) was one of the first to address the tax benefit question with respect to owner occupied housing; also see de Leeuw (1971) for an overview of early cross-sectional housing demand literature.

[16]Externalities created by an expenditure are beyond the scope of the present study. In this case I consider only the direct tax effect of the expenditure. If other research indicates that housing is a public good, this may justify a government subsidy. Such subsidy should, however, be directed so as to maximize the public benefit. In other words, if it is beneficial to society for someone to own rather than to rent their home, then subsidize that decision. The current HMI deduction is not such a subsidy.

dissertation).[17]

In terms of the potential to achieve progressivity (or even neutrality), it is important to recognize certain inherent limitations at the outset. First, by the very nature of the activity being subsidized it is unlikely that many, if any, of the poor will ever benefit directly from any subsidy of home ownership.[18] Assistance for this group must be dealt with separately. On the other hand, there is ample room for improvement in the area of designing a policy that more closely accomplishes its stated objective.

It is important to recognize that as long as an income tax system has a progressive rate structure this will inevitably result in an upside-down or regressive effect on any tax expenditure styled as a deduction (McIntyre 1995, and Susswein 1994).[19] In this dissertation, the present progressive rate structure is accepted as given and controlled in the empirical analysis.

It is not difficult to understand public disapproval of any form of government involvement in redistributions favoring special business interests (which includes the HMI deduction to a large extent). Confusion surrounding the HMI deduction stems

[17]Perpetuated by real estate industry proponents (Brinner *et al*. 1995) as well as some politicians (for example see Senator D Amato s comments quoted from Tax Analysts 1995e in subchapter 2.2 Current political debate surrounding the HMI deduction, of this dissertation).

[18]Through higher prices of overall housing services resulting from the HMI subsidy as well as the federal subsidy interest costs for rental property, the poor are probably hurt in terms of their chances of affording their own home.

[19]An example of the upside-down effect: Two taxpayers A & B each take the same $1,000 deduction. Taxpayer A is in a 15% marginal tax bracket while B is in a 39.6% bracket. The government s expenditure on A is $150 ($1,000*15%) while B s same $1,000 deduction cost the government $396 ($1,000*39.6%).

largely from the fact that it enjoys the support of both powerful special interests such as the real estate and mortgage banking industries (America s Community Bankers *et al.* 1995, as well as Brinner *et al.*1995 writing for the National Association of Realtors), as well as existing home owners, and more objective parties who support home ownership as a public good. The point is that support for home ownership and the desire to subsidize certain classes of potential home purchasers may be misdirected into support for the HMI deduction. This is particularly true if the deduction acts to encourage higher home prices in areas where high prices act as a barrier to entry to the home market, as well as cases where taxpayer income is too low to allow full use of the deduction.

2.2 Current Political Debate Surrounding the HMI Deduction

This subchapter is intended to place the HMI deduction in terms of its political importance as well as to illustrate the positions taken on the issue by significant political interests. Although determination of the correct (be that most efficient, most equitable, etc.) policy on this issue is beyond the scope of this dissertation, it is important to view the HMI deduction in light of the federal government s strategy with respect to the expenditure. This subchapter deals briefly with the strategy issue as well. It is interesting to note that, although traces of concern for fiscal federalism appear in this debate, the issue of federalism has not been a dominant concern.

The current political debate regarding the HMI deduction is dominated on one side by real estate and mortgage banking interests wishing to preserve the HMI deduction. On the other side, the HMI deduction is opposed by those in favor of broadening the federal income tax base (typically in the form of a flat tax). Further, the mortgage-interest deduction has been referred to as the most treasured tax benefit of the middle class. The largest benefits, however, are reaped by the affluent with some 44 percent of the tax benefit in 1995 going to the five percent of households earning $100,000 or more.

Bruce Bartlett of the National Center for Policy Analysis (a non-profit, nonpartisan research institute) responds to many of the claims of HMI deduction advocates in the real estate and real estate finance industries. Essentially, these groups supporting the HMI deduction have taken the position of opposing the flat tax, primarily because of the probability that a flat tax would eliminate or seriously reduce the HMI deduction. Bartlett (1996), responding largely to the Brinner *et al.* (1995) paper reporting the DRI/McGraw-Hill (a private economic consulting firm) study results. The DRI study, that was sponsored by the politically powerful National Association of Realtors, attempts to bolster the real estate industry position on several of the key issues in the HMI deduction/flat tax debate.

Bartlett challenges conclusions drawn from the DRI study by Brinner *et al.* (1995) that eliminating the HMI deduction would adversely impact home ownership, as well as impose unfair hardship on real estate and related industries. Real estate and mortgage banking industry organizations (America s Community of Bankers *et al.* 1995; Brinner 1995; and others) argue that reduction or elimination of the HMI deduction would have numerous adverse behavioral effects.[20]

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[20]Such behavioral effects include: (1) reduced incentive for home ownership as a result of a reduction in both the after tax cost of home ownership of between 10 and 16.1% resulting in a $1.7 trillion loss of equity, as well as a reduction in the relative value of a home as compared with other investment opportunities, (2) reduced property tax revenues, also as a result of lower real estate prices, (3) elevated levels of default losses

Most recent opposition to the HMI deduction stemmed from concern over the federal deficit, and the view that the HMI deduction represents largely a subsidy of the real estate industry. Numerous flat tax proposals have recommended elimination of the deduction primarily as a base broadening measure (*Freedom and Fairness Restoration Act of 1994* sponsored by Representative Armey). Other flat tax proposals advocate its preservation.

During the March 2, 1995 Finance Committee hearing on middle-income tax proposals (Tax Analysts 1995e), demonstrating awareness of the federalism issue in the context of the HMI deduction, then Senate Finance Committee Chairman Packwood commented:

> If you want to see an interesting dichotomy, posed to an audience of basically upper income people, this question. And you are right on your percentages. I figure three percent [of home mortgages are] above $ 250,000 on the [amount of] mortgage interest. There are relatively few mortgages above $ 250,000.
>
> If you would limit the mortgage interest deduction to $ 250,000 you could, dollar-for-dollar, pay for an individual 17 percent capital gains tax rate. Ask them which they would prefer. If you are in Des Moines, they prefer the capital gain. If you are in downtown San Francisco, they prefer the home.

Whether the motive was a concern for fiscal federalism, merely a pro-business posturing on the issue, or both, at that time Packwood s statement is important in that it places the federalism issue in the political debate over the HMI deduction, and reflected

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estimated at about $11 billion resulting from the elimination of the HMI deduction, capital erosion, commercial bank failures and credit contraction, (4) reduced spending on amenities resulting in a diminished standard of living, and finally (5) a general decline in the real estate industry leading to numerous adverse economic consequences.

the struggle between housing industry interests and other non-housing related business interests toward the HMI deduction (as well as other itemized deductions). There appeared to be a strong preference on the part of the business community in general for the capital gains tax break (Stephen E. Nordlinger. Venture capitalists defend special tax treatment for capital gains. *The Baltimore Sun*, May 5, 1985 referenced by Tax Analysts 1985). Leading up to TRA 86, when it appeared that many of the proposals in the Treasury tax plan would be detrimental to business, corporate policymakers felt that, to the extent that a trade-off was likely, priority should be given to reducing the federal deficit (i.e., reducing tax cuts) over tax simplification. Astute business leaders must have realized that to be of any size, such a capital gains cut might preclude a mortgage interest break in a deficit reducing or at least revenue neutral package.

During a March, 1995 Senate Finance Committee hearing on middle-income tax proposals (Tax Analysts 1995e), then Chairman Packwood recognized that the social policy imbedded in the mortgage interest deduction was to create broad middle class home ownership. Later in the same discussion, Senator D Amato commented that I just think that it (the HMI deduction) is the cornerstone for home ownership in this country. D Amato continues, commenting on the value of the HMI deduction to a young couple moving from an apartment. To which Senator Moynihan replies I do not think that there is a very strong relationship to be found there that home ownership depends on the home mortgage interest deduction. Packwood immediately agrees You can go even further. Canada has no home mortgage deduction. They have roughly the same percentage of home ownership that we do. The chairman further comments on the possibility that the home mortgage deduction has artificially increased the price of houses because as long as you can deduct some portion of it you are willing to pay a slightly higher price, and that without the mortgage deduction you would have lower-priced new homes.

Yet, another indication of public officials awareness of the federalist issue addressed in this dissertation came on the day before the New York Republican primary. As Torry (1996) reports: Dole supporters Gov. George Pataki and Sen. Alfonse D Amato commented that the Forbes flat tax plan would financially hammer New Yorkers because they could not deduct home mortgage interest or the state s own steep tax payments on their federal returns.

Thus, there is anecdotal evidence of the interest on the part of higher cost of living states (e.g., New York, see comments by Gov. George Pataki and Sen. Alfonse D Amato) in the continuation of the HMI deduction. This is further evidence of the conflict between higher and lower living cost states in the words of Sen. Robert Packwood of Oregon. Support of the HMI deduction may, in essence, be support for the status quo in highly developed (i.e., more expensive) regions of the country.[21]

2.2.1 Model Tax Treatment

1984 U.S. Treasury model tax treatment (as explained by Bradford *et al.* 1984) recommends deductibility of HMI as a personal itemized deduction. Bradford *et al.*

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[21]The unanswered question is why don t the lower cost regions come to mind? Is it that they fear the ripple effect of damage to the national status quo that might result from a shock to the major metropolitan housing markets? Investigation of this issue is left for future research.

explains the Treasury s position as follows:

> The effect of this policy may be equated to allowing any taxpayer to enjoy tax-free the value of consumption services directly produced by a house (or other asset), regardless of the method he uses to finance the purchase of this asset. The tax-free income allowed is thus the same whether he [the taxpayer] chooses to purchase the asset out of funds previously accumulated or to obtain a mortgage loan for the purpose.

In other words, allowing a deduction for HMI levels the playing field in terms of tax effect between wealthy taxpayers who choose to finance a home with funds previously accumulated, and others who may need to finance their home purchase. This result comes about because the taxpayer with other invested capital is currently (before buying the residence) paying tax on the income from the home, thus will save that tax by shifting the investment capital to a residence. No such effect occurs when the home buyer must finance. Nevertheless, the model allows for the argument in favor of disallowing interest deduction on tax base widening grounds as well as to end the tax bias against renting.

This position reflects an attempt on the part of Treasury to level the playing field between those who must borrow to finance a home purchase and those who have access to previously accumulated funds. The only alternative means of leveling the playing field would involve measuring and taxation of implicit rental income from the owner-occupied home--a quagmire the Treasury wisely wished to avoid.

In other words, there are obvious differences between lower (renters) and middle (owner-financed) classes as well as between middle and upper (owner-non-financed) classes. HMI deduction intensifies the difference between low and middle, but mitigates the difference between middle and upper economic levels. The implication is that perhaps this is not a single linear function, but rather there is a structural change in the function across income/wealth levels.

Part of Treasury s argument, also, is that HMI deduction benefit is likely not to be a linear function of wealth/income. Rather, as shown in Table 10, both the critical housing finance issues as well as the effect of the HMI deduction differ greatly between lower and upper income taxpayers.[22]

2.2.2 Political Compromise

In his criticism of TRA 86 Pechman (1989) discusses what he calls earmarks of numerous political compromises. In his discussion of the 1986 Tax Reform, he refers to existing federal tax subsidy of owner occupied housing as (p)erhaps the most unsatisfactory feature of the act.

Regardless of the rhetoric used, one thing is clear--the real estate and mortgage banking industries stand to suffer the brunt of any reduction in the HMI deduction. Thus, it is safe to assume that these industry lobbies have attempted to preserve their tax favored status. Finally, given the obvious bias on the part of the federal government, it is probably safe to say the likelihood that the U.S. public spends more than the natural market equilibrium amount on personal residence.

2.2.3 The Federal Administration

In terms of the intended consequences of the HMI deduction, the position of the Clinton administration and the U.S. Department of Housing and Urban Development

[22]Although not shown in the table, the position of middle income taxpayers can differ from that of either their lower or upper income counterparts.

(HUD) deserves mention. The HUD National Homeownership Strategy, developed under Housing Secretary Henry Cisneros in 1994, is capsulized in the slogan the goal 67.5% (i.e., a national home ownership rate of 67.5%). The question Why homeownership? is addressed by referring to four fundamental national benefits or areas of commitment associated with home ownership[23]: (1) personal financial security, (2) strengthening families and good citizenship, (3) community, and (4) economic growth. (HUD National Homeownership Strategy and Background)

The Clinton Administration s goals with regard to home ownership are summarized in the HUD National Homeownership Goals. The statement of these goals includes recognition of the fact that upper income households headed by persons over 45 years of age have done well in terms of home ownership; their younger counterparts with less income have actually experienced significantly declining rates of home ownership. Also noted are the low rates of home ownership for African-American and Hispanic households. The Administration sees a special responsibility and an important opportunity to target underserved populations.

The basic theme of the National Homeownership Strategy, then, is to reach an all-time high level of home ownership by cutting the cost of home ownership (particularly for those potential home owners who are presently priced out of the market), opening up markets for home ownership (with emphasis on minority households), and expanding

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[23] Ashley *et al.* (1996) provides an extensive literature review in this area. Using a combined archival and survey methodology, they offer evidence that, although past research has had mixed results, the HMI deduction is an important factor in the home purchase decision only for upper income taxpayers (as defined by the IRS).

home ownership opportunities primarily through education (presumably targeted at disadvantaged segments of the population). In the HUD 100-item action plan, actions 29-51 deal specifically with cutting transaction costs, reducing down payment and mortgage costs, and increasing availability of financing.

Given what is known about the distribution of the HMI deduction across income and ethnic categories, the only HUD objective that appears particularly well served by the HMI deduction may be that of economic growth through stimulation of the housing industry.

2.2.4 Political Power

It may simply be that the HMI deduction represents the use of political power to effect a wealth transfer, rather than an attempt to achieve any particular social goal. As Inman and Rubinfeld (1996) comment regarding the federal subsidy of state taxation of housing (i.e., the deductibility of real property taxes):

> The rate of subsidy is the taxpayer s federal income tax rate and is limited to only those who itemize their deductions; typically, middle and upper income households. By the arguments here, middle and upper income households are the appropriate target group [to receive the tax benefit], for they constitute the likely decisive coalition in state politics.

Inman and Rubinfeld (1996), in their discussion of legislative choice models, remind us that federal government legislatures are merely representatives elected from the states with a mandate to represent the preferences and concerns of their state constituents. Future research might examine lobbying and voting on HMI deduction and related issues (particularly in the mid 1980s surrounding the 1986 and 1987 Tax Acts) to seek evidence of federalist bias.

Perhaps a major cause of the lack of success experienced by flat tax legislation to date is the problem of the impact on the flat tax rate required in order to maintain the seemingly indestructible HMI deduction.

Despite the potentially beneficial behavioral consequences of increased home ownership, in terms of actually footing the bill for the HMI deduction, it can reasonably be argued that such subsidy is largely a zero-sum game.[24] The seemingly national support for the HMI deduction is evidence that this point is not widely understood. As in all such cases, it is of interest to ask who wins and loses.

2.2.5 International Evidence

The National Center for Policy Research (Bartlett 1996), takes a position against the pro-HMI deduction lobby. Bartlett argues that, based on observable rates of home ownership where interest is not deductible, international data suggest that the HMI deduction may not have as significant an effect on housing as the opposition believes. Bartlett shows that home ownership rates in other countries do not appear sensitive to HMI deductibility. Israel and Australia, for example, have home ownership rates significantly higher than the United States and no mortgage interest deductibility. Also, Canadian and Japanese home ownership rates are about the same as in the United States, with no deductibility. France and the Netherlands, on the other hand, have much lower home ownership rates despite mortgage interest deductibility and higher tax rates.

2.2.6 Home Ownership and the Community

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[24]In the context of the wide range of economic development incentives currently offered throughout the 50 states, Kenyon and Kincaid (1991) question whether such incentives merely shift activity (and thus resources) from one jurisdiction to another.

In order to put the HMI deduction in proper context one must consider the relative necessity of home ownership. For example, most would agree that a home (i.e., a shelter, as opposed to being homeless) for each of its citizens should be a fundamental goal for a civilized nation. Further, in an egalitarian society, to the extent that a citizen or class of society is homeless, those who are more fortunate should be willing to provide financial aid for their less fortunate counterparts. Home ownership, on the other hand, while desirable, does not share the same level of basic necessity as a fundamental human need. In other words, home ownership (particularly in the case of upper income citizens) is, by its nature, different than a welfare program. Where one might favor income redistribution for the purpose of providing basic shelter for the homeless, one might reasonably reject the idea of income redistribution for the purpose of promoting home ownership.

Hopefully, an American citizen who is fortunate enough to have his or her basic shelter need met would be interested in helping others who are not as fortunate, regardless of where either lived. While the benefits of home ownership (and thus its desirability) are undisputed, it is not necessarily the case, however, that a resident of Des Moines is interested in subsidizing home ownership for a resident of San Francisco. In other words, while good citizens of every community are interested in doing their share to promote the standard of life in their own community, it is not necessarily true that residents of one community feel obligated to make financial sacrifices for the benefit of residents of other communities beyond a basic level of welfare.

It seems unfair and illogical to ask someone to make financial sacrifice for the benefit of someone else who is better off than themselves. To some extent, this is what the HMI deduction accomplishes. If I choose to live in San Francisco (perhaps because I can earn a higher wage there than elsewhere), is it fair to ask a resident of Des Moines (who may be giving up earning potential by living there) to subsidize me for a non-necessity?

Musgrave s 1965 argument that personal preferences differ furthers the case against a national level HMI deduction (or at least in favor of some sort of indexing).

Other concerns that further cloud the issue of public sentiment include (Sheffrin 1993): (1) the lack of public understanding of such concepts necessary to the understanding of the effects of taxation, and (2) to the extent that an issue has not been discussed seriously in the public domain and public opinion will be ill-formed and volatile on that issue.

2.3 Fiscal Federalism

The philosophy of federalism is a key factor in motivating the present study. The purpose of this subchapter is to briefly define federalism and its significance in American society, and its expected importance in federal tax policy--in particular, its possible significance with respect to the HMI deduction for federal income tax. A more detailed historical background on the subject is available on request.

The concept of federalism deals generally with the division of powers between national and regional (state) governments. Under federalism, both levels of government operate simultaneously and exercise power directly over the people, with the basic alternatives to federalism being unitary (i.e., a single, centralized control structure) and confederate (i.e., a completely decentralized control structure with all political power resting at the state level) forms of government. Thus, federalism represents somewhat of a compromise between the two extreme forms of government in terms of power centralization.

At the time of the formation of the United States, the Federalist founders were concerned that direct democratic power would be suboptimal, since masses could manipulate government to play a confiscatory role by redistributing wealth through the tyranny of a majority. At the same time, antifederalist leaders feared that government would be controlled by commercial elites who would not be motivated to act in the interest of the common good. Madison, therefore, proposed federalism--with divided government, checks and balances, and pluralism of interests--as a means of moderating the clash of interests between monied and debtor classes (Ladenheim, 1999a).

In his descriptions of the evolution of the relationship between the states and the national government, Ladenheim, (1999b) includes a chronology of critical points in the evolution of U.S. federalism, with particular focus on the second half of the twentieth century. Finally, it offers several useful web links for further exploration. Ladenheim (1999b) presents the Sixteenth Amendment, adopted in 1913, as a watershed for modern federalism. Although the size of the tax was extremely modest by today's standards, it created the foundation for twentieth century federalism, with its emphasis on intergovernmental transfers and the use of taxing and spending powers to further national policies.

2.4 State-to-State Variation in the Mortgage and Fair Housing Environments

The fiscal federalism literature examines across-state disparities in federal expenditures. Normally, however, in the context of tax expenditures, Federalists tend to focus on expenditures with more or less direct impact on state budgets such as the deductibility of state and local taxes, as well as the excludability of interest income from state and local obligations. As this subchapter shows, there are many differences between states that provided a reasonable basis to expect the possible existence of cross-state differences in the federal income tax expenditure for the HMI deduction. An objective of this dissertation is to bring the HMI deduction into the light of federalist scrutiny.

In his discussion of the economic pitfalls of decentralization, Prud homme (1995) offers the following rationale for concern over regional disparities in general within a federal system. The theoretical justification of the present research extends Prud homme s notion of regional differences logically to apply to states:

> each region is a social and political entity that exists beyond the individuals who reside there. In assessing their well-being, the citizens in a region consider not only their own income but also the income of their fellow citizens much more than the income of inhabitants of other regions. Interregional disparities are not merely statistical artifacts; their perception is a sociological reality. There is a political demand for action to reduce interjurisdictional disparities.

Detailed discussion of specific personal and state characteristics is included later in this dissertation as part of the discussion of fully partialled model variables.

Regarding fair housing, in testing Hypotheses 6 and 7 (as stated in subchapter 4.5 of this dissertation), the possible existence of noticeable state-to-state differences in the HMI deduction benefit resulting from the respective state s fair housing environment (HUD 1979; Metcalf 1988; BNA 1988; Turner, *et al*. 1991; Yinger 1999) is tested. Fair housing (as defined in the 1968 Civil Rights Act) refers to the basic human right to choose a place to live, within one s means (Yinger 1999). It is important to recognize that the effect on HMI deduction distribution of most fair housing cases is probably negligible, however these cases are hypothesized to be a reasonable proxy for an overall environment conducive to equal home ownership opportunity.

For purposes of this study, fair housing is measured principally by looking at whether the state or its various localities has been recognized by the Assistant Secretary for Fair Housing and Equal Opportunity as being substantially equivalent to Title VIII of the Civil Rights Act of 1968[25] (Bureau of National Affairs 1988), as well as other factors contributing to the homeownres ability to enjoy fair housing.

2.5 Tenure Choice, Housing Demand and Mortgage Choice

The economics literature in the areas of Tenure Choice,[26] Housing Demand and Mortgage Choice provide much of the theoretical basis for the second part (the fully partialled model) of this study. This subchapter contains a short summary of the literature.

2.5.1 Tenure Choice and Housing Demand

First, in terms of the closely related issues of tenure choice and housing demand, the idea that the housing decision is actually a joint process is well developed in the

[25]It was in Title VIII of the Civil Rights Act of 1968 that Congress made explicit the Nation s policy on fair housing.

[26]Tenure choice is defined as the decision to own versus rent ones residence.

economics literature. Li and Trost (1977) similarly found simultaneity present.[27] A significant contribution of the Li and Trost (1977) paper is that previous studies modeling the housing choice processes independently are suspected of yielding biased estimates, and that accounting for simultaneity is, thus, appropriate.

Rosen (1979a) uses the 1970 PSID to extend the housing choice literature by developing a model that allows for investigation of the impact of the implicit tax subsidy on both decisions.

The economics literature is replete with models of tenure choice, each slightly different from the other, but with the vast majority of more recent studies including tax effects in some form or another. A fundamental tenet underlying this literature is that the relative cost of renting versus owning influences the tenure choice decision. One might argue that there is actually no difference between renting and owning in terms of the benefit of a tax deduction for mortgage interest because both the home owner and the landlord are entitled to the same deduction. On the other hand, there is little question that for the home owner who itemizes, the HMI deduction results in real cash savings. Although as Ashley *et al.* (1996) point out, results are somewhat mixed, there is abundant empirical support for the theory that tax effects are an important determinant of home ownership. Since the HMI deduction for federal income taxes provides a cost advantage

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[27]Li and Trost use 1971 PSID data to first test for simultaneity between the expenditures and choice decision models. The analysis uses a maximum likelihood ratio test of the ratio of the vector of assumed unrelated OLS and Probit estimates of the expenditure and tenure models respectively in the numerator, over the vector of two-stage maximum likelihood estimates in the denominator. The asymptotically distributed X^2 ratio indicates statistically significant simultaneity.

to owning over renting for those who mortgage, it (the HMI deduction) should be among the explanatory variables in a model seeking to explain the choice between renting and owning.

Borsch-Supan and Pitken (1988), using data from the 1977 Annual Housing Survey for the Albany-Schenectady-Troy, New York, MSA (Metropolitan Statistical Area[28]), to estimate a model of tenure choice and housing demand categorize tenure choice explanatory variables as either demographic or financial.[29] Demographic variables used by Borsch-Supan and Pitken (1988) include marital status, number of children, age, and race. A drawback to the Borsch-Supan and Pitken (1988) model results from its design and purpose--to evaluate a single metropolitan area. Wilson (1979), Murdock and Hamm (1988), Narwold and Sonstelie (1992), Linneman (1985) (discussed in subsection 2.4.3.2 Demographics) contribute to this literature.

Rosen and Rosen (1980) use a time series to show that tenure choice is largely a function of the relative prices of renting versus owning, and that for the period from 1949 to 1974, the long run home ownership rate would have been some four percent lower

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[28]MSAs are defined by the Bureau of the Census as relatively freestanding metropolitan areas not closely associated with other metropolitan areas, and typically surrounded by nonmetropolitan areas (U.S. Dept. of Commerce 1993).

[29]Financial variables include out-of-pocket costs, expected appreciation, and opportunity costs of equity in the house. For a rented household, out-of-pocket cost is the gross rent. For the owner occupied household it consists of mortgage and real estate tax payments, utility costs, insurance payments, etc., reduced by estimated savings on federal income taxes resulting from deductibility of payments. Borsch-Supan and Pitken (1988) find out-of-pocket costs to be highly significant in determining tenure choice. In the present study, the focus is on out-of-pocket costs. Consideration of expected appreciation and opportunity costs is omitted.

without federal income tax subsidies (including not only HMI deduction, but property tax deduction and exclusion of imputed rental value of the home as well). In a separate study, Rosen (1979b) finds similar results. In the present study, a major drawback is the inability to measure the cost of renting at the household level.

It should be noted that often the tenure choice decision is modeled concurrently with the housing demand decision. The two are not equal where tenure choice refers to the choice between renting and owning (assumed to be closely related to the length of time or tenure in that home). Housing demand, on the other hand, has to do with the characteristics of the home chosen (e.g., number of bedrooms, bathrooms, size of the home, etc.).

2.5.2 Mortgage Choice

Recently, and influenced largely by the research efforts of a Canadian Economist Lawrence Jones (see Jones 1986, 1991, 1993, 1994, 1995a and 1995b), a body of literature has developed that looks empirically at the determinants of mortgage debt. Early research in this area questioned whether mortgage borrowing was more supply or demand determined, whether the demand portion was properly characterized as consumer credit related, or more derived from asset demand and portfolio optimization (as in Jones 1986). Advances in the mortgage choice literature are reviewed by Folain in 1990. More recently, Jones (1994 and 1995a) decomposes the demand side of mortgage debt based on the realization that not all mortgage debt is used to finance home purchase (i.e., recognizing the existence of non-housing related financing via home mortgage), as well as the possibility that some home financing may be from non-mortgage sources. In short, demand for housing and demand for mortgage debt are not necessarily inextricably related.

For purposes of the present study, a rudimentary model of mortgage demand is used to model potential differences between states that might ultimately result in differences between states in the benefit from the HMI deduction.

Although sometimes for different reasons, it is not surprising that the group of variables that impacted the mortgage choice decision bears resemblance to the group that impacts housing decisions (tenure and demand). A major exception to the similarity between the two groups of causal variables (i.e., housing and mortgage choice) may have to do with the legal environment of the mortgage industry that can vary from state to state. A review of selected legal/regulatory factors is available on request.

As discussed above in Section 2.5.1 of this dissertation Tenure Choice and Housing Choice, there is widespread (although somewhat controversial) theoretical and empirical support for the claim that the HMI deduction is a factor in the tenure choice decision. Modeling the joint demand for housing and mortgage debt, however, leads into an area of the literature that is relatively less developed.

Aside from the fact that at an intuitive level it is reasonable to assume a joint or simultaneous process of tenure choice, housing demand and mortgage choice, there is support in the literature for such a proposition. Henderson and Ioannides (1986) examine the joint tenure choice and housing demand functions with a significant addition. They introduce a rationing function into the tenure choice function to represent the possibility that a family may be excluded from the mortgage market. This can occur when a loan officer perceives a high default risk with a particular family, or because of discrimination. Henderson and Ioannides (1986) hypothesize that high risk may be inferred (by the loan officer) on the basis of age, sex, race, low education or low current income, controlling for socioeconomic characteristics. They might discriminate on the same basis. The hierarchical model discussed in Chapter IV of this dissertation is a preliminary step in exploring this possible three-way joint process, factoring in differences between states.

The literature on redlining in mortgage lending generally supports the Henderson and Ioannides (1986) hypothesis of rationing. In his 1985 theoretical paper, however, Ostas (1985) explains that the empirical work in the area of redlining suffers from the problem of identification. That is, alleged redlining behavior is observed in certain areas, but the problem (particularly with reduced form models) is to disentangle supply or mortgage lending influences from those on the demand side. Ostas (1985) develops a skeletal model of the mortgage and housing markets.

Jones (1993) points out that two streams of literature have developed dealing with home mortgage debt. The first considers borrowers choices of loan attributes from a menu made available by lenders (see Folain 1990 for a comprehensive overview). The second focuses on the borrowers option to terminate the loan contract (a comprehensive overview is provided by Hendershott and Van Order 1989). Jones (1993) further points out the partial nature of both streams of literature in that the desired debt level is not endogenized (i.e., it is not determined within the model).

Jones (1993) speculates that the lack of a model accounting for the desired debt level is a result of a hypothesized strong linkage between mortgage and housing demand. Pointing out the fact that nearly half of U.S. home owners have no mortgage debt, the strong linkage hypothesis is questioned. Results suggest that mortgage demand should be decomposed into housing and non-housing components.

CHAPTER III

METHODOLOGY - INDIVIDUAL MODEL FILE (IMF) ANALYSIS

3.1 General Overview

This first part of the analysis focuses on the Statistics of Income Individual Model File as the dataset used for empirical study. The general approach here is to first test for significance of the effect of income and state of residence on mortgage interest deduction benefit. Then, assuming significant effects are found, the next step is to partial out the effect of income and test for a residual effect of state of residence.

3.2 Preliminary Analysis

The data analysis performed in this study involves mainly the first two steps of what Hartwig and Dearing (1979) describe as a four-step exploratory data analysis process. The first of the four steps involves the preliminary, or descriptive, analysis of single variables, and is discussed further in Section 3.2.1 below. The second step begins to consider relationships between variables, however it is limited to bivariate analysis. This second step results in several of the hypotheses tested in this study. Finally, the third and fourth steps are the construction of a model involving multiple variables, and the testing of causal relationships. Although the present study ventures into this third and fourth steps at a conceptual level, and in a very limited way with the actual data analysis, these last two steps of the analysis are the subject of future research.

The first step in the actual data analysis involves the preliminary descriptive analysis and symmetrizing of the data (i.e., attempting to redistribute the data about its mean in a more symmetric fashion so as to approximate a normal distribution). Since the state-by-state perspective has not been examined closely in prior literature, some reporting of this basic process is appropriate. The process here is to describe and possibly reexpress/transform the data as necessary.

3.2.1 Description

Although the procedures actually used may extend beyond those suggested here, at a minimum, the single variable descriptive methods suggested by Hartwig and Dearing (1979) are used to describe the data in terms of the three basic characteristics of location, spread and shape.

One of the most important and obvious characteristics of the data chosen for this study is the fact that the dependent variable, HMI deduction benefit, is a censored variable. A censored regression model is one in which the dependent variable value is cut off for some observations (in the case of the HMI deduction tax benefit, at zero), however the corresponding independent variable information is available (Pindyck and Rubenfeld 1991).

For HMI deduction federal income tax benefit (the dependent variable), Table 1 provides the following descriptive statistics by state: mean HMI benefit per tax return, number of returns in the sample, standard deviation, median, minimum, maximum, and variance.[1] It is important to note that the figures provided in Table 1 are statistics of the

[1]Each case in the IMF contains a weighting factor which could be applied in order to produce a closer representation of the actual underlying population.

data set used to test the hypotheses listed below. They are derived from the IMF (Individual Model File), a stratified random sample which systematically over samples from higher income levels, and which is also truncated for this study at income greater than $200,000 (due to suppression of the state identification for such cases). Thus, while these data are effective for purposes of comparing between states, they should not be interpreted as representing the overall population.

Also of importance in determining the reference group for testing H3, Colorado, with a mean HMI benefit of $658 per return comes closest to the national average of $657 per return.

3.2.2 Reexpression

At this point in the analysis of a variable, if non-normality is detected, this is an opportune time to consider possible transformation or reexpression of that variable. This may be accomplished through the application of some arithmetic function other than the one on which the variable was originally recorded. The purpose here is to rescale the data so as to cure the non-normality in a way that can be related back to the original data.[2]

In the IMF, taxpayer AGI (Adjusted Gross Income, a key independent variable in this study) is, as expected, both highly skewed, as well as heteroskedastic. Throughout the literature, income measures are frequently logged as a cure for both the heteroskedasticity and skewness, which are normal characteristics of most income measures. Since the income measure chosen for the present study, however, is the

[2]According to Hartwig and Dearing (1979), non-normality and non-linearity (that arises in the bivariate analysis step that follows) are not the same thing; however, the two go hand in hand. In any case, reexpression is a useful response to either.

taxpayer s AGI, the distribution of this tax reporting figure tends to be lower than most other income measures (i.e., most of the adjustments to AGI in deriving the income measures used in other studies tend to be primarily positive or add back adjustments). As a result, of this characteristic of AGI, combined with the effect of high end truncation, the income measure used in the present study is, although right skewed as normally is the case, actually highly heteroskedastic with increased variance at both the high and low income levels. The result of this effect is that the normal log transformation provides only a marginal improvement in the skewness problem (while actually having an adverse effect on heteroskedasticity).[3]

3.3 Data

3.3.1 Tax Database Overview

The data set used to test hypotheses regarding differences in HMI tax deduction benefit between states is the Internal Revenue Service 1992 Individual Public Use Tax File (IMF) compiled as part of the Statistics of Income Program (Individual Statistics

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[3]The two forms of the income variable were similar, and the log transformation produced a slightly stronger association with the dependent variable. The results of the log transformation are reported below. Due probably to the strength of the causal relationships among variables, there was, however, no significant difference in the overall outcome of any of the three hypotheses tested between the two forms of the income variable. In order to log the income variable without losing those with negative AGI (a significant number of cases), it was also necessary to add a constant amount of 4,400,000 to AGI. This figure was chosen because the bottom end of the range of AGIs was 4,389,000 and this was a round number which made all AGIs positive, thus preserving all cases.

Since the AGI variable was truncated at the high end, and AGI values below zero indicate no taxable income and, thus, should have no effect on HMI tax benefit, truncation at the low end could also be considered as a further transformation option which would tend to improve the linearity of this variable.

Branch, SOI 1992). The 1992 IMF contains 93,262 records compiled from a stratified random probability sample chosen to represent all unaudited individual income tax returns filed either by U.S. citizens or U.S. residents for the 1992 tax year.[4] Each record represents an individual tax return (i.e., either a 1040, 1040A, or 1040EZ) filed during 1993. As of Summer 1997, the 1992 IMF is the most recent file available.

Of the original sample of 93,262 tax returns, 32,976 are unusable because they have no state code. All but 288 of these have no state code as a result of blurring due to high income (for confidentiality purposes). The remainder have no state code for reasons other than high income leaving a usable sample of 60,286 returns.[5]

3.3.2 Income Variable

There are several choices for the income variable. Income measurement varies widely depending on data used. In the present study, AGI is used as the income metric because it is considered to be the best measure of what is thought of as income in a tax context. Because of the motivation on the part of most taxpayers to minimize current tax liability, AGI will tend to be lower than most other common definitions of income.

Because of the close theoretical linkage between the mortgage interest deduction and income, the measurement of taxpayer income is expected to be of critical importance

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[4]Although most of the 113.6 million returns in the population were filed for the 1992 calendar year, a few were actually filed for prior years during the 1993 calendar year and were used in place of a 1992 return under the assumption that the yet unfiled 1992 return was best represented by the returns for previous income years processed in 1993. Also, tentative and amended returns were not sampled.

[5]This blurring and loss of high income cases results in obvious limitations on the generalizability of these results.

in terms of the results of this empirical analysis. A limitation of the chosen data is the lack of information about taxpayer wealth other than income, thus income must serve as a proxy for wealth.

Income measurement varies widely depending on data used. Nonetheless, income (or its natural log as it is often specified) is generally one of the most highly significant causal factors, and is included in virtually all housing and mortgage choice models. Higher income is associated with a greater tendency to own, increased housing service demanded, and increased mortgage demand (up to a certain level[6]).

Rosen (1979a), using the Panel Survey of Income Dynamics (not usable for the present study due to its failure to represent each of the 50 states as well as its omission of rural households from the sample), employs the concept of net permanent income, that is the sum of permanent adjusted gross income after taxes, transfer payments (i.e., Social Security, public assistance, etc.), and net imputed rent.

In analyzing the process of measuring the distributional effects of tax changes for the Congress, Davis (1991) discusses various income concepts. In the traditional [distribution] table analysis, families are classified by nominal income groups. The advantage of nominal income is that it requires minimal explanation for the Congress. Its two main drawbacks are: (1) nominal income does not correlate well with ability-to-pay, and (2) the number of families in nominal income classes is normally unequal (e.g., compare the number of families with incomes between $30,000 and $40,000 with the

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[6]Future research should examine the relationship between income and mortgage consumption in order to determine the precise level of income where this relationship changes.

number with incomes above $200,000).

Another family income measurement technique discussed by Davis (1991) (and attributed by Davis to the CBO 1987 study), called adjusted family income, adjusts family income relative to the poverty line, that, in turn, is adjusted for family size. Further, as applied by CBO (Congressional Budget Office), this measure is normally used to create percentile groups (overcoming the uncertainty as to the number of families in each group as with nominal income ranges discussed previously). The drawbacks of this technique pointed out by Davis are: (1) the family size adjustment is somewhat arbitrary, and (2) Congress has relatively more difficulty explaining the concept to their constituents.

Any discussion of income concepts would be incomplete without mention of the Haig-Simons definition:

> income is the money value of the net increase to an individual s power to consume during a period. This is equal to the amount actually consumed during the period plus net additions to wealth.

This definition has become the standard of public finance economists against which any income measure is compared (Rosen 1988). In the context of an owner-occupied housing discussion, the primary implication of Haig-Simons is the notion of net imputed rental income. Although numerous (but not all) studies on housing choice include net imputed rental income, the present dissertation omits further consideration of the concept.

Yet another concept in the measurement of income is that of annual or temporary versus lifetime or life cycle income. As it applies to the present study, the implication might be that since the HMI deduction is intended to help first-time home buyers (see discussion under subchapter 2.2 Current Political Debate Surrounding HMI Deduction), the deduction might be viewed as a form of life-cycle redistribution. In this case, the logical implication would be that a life-cycle accounting period would be more applicable (Menchik 1991). For simplicity, however, the present study will use a single year analysis, leaving cross-temporal considerations for future research. A possible significant drawback to the single period approach is that, even with adjustments designed to smooth out effects of non-recurring items of income, it is widely accepted in the literature that an average income over a longer period of time is preferable to a single year snap-shot, particularly when income is being used as a proxy for wealth as it is in part in the present study (Davis 1991).

Other studies have used similar concepts of income for taxpayer classification purposes. Some of the common measures used with tax return data are referred to as expanded income (Joint Committee on Taxation 1985), family economic income (U.S. Department of Treasury, Office of State and Local Finances 1985), modified expanded income (Nelson 1987), and adjusted expanded income (Ricketts 1990). Ricketts (1990) thoroughly discusses and compares these alternatives.

Adjusted gross income (reported on individual tax returns) was designed to facilitate tax administration. Its composition has changed over time making comparison across time difficult. The Internal Revenue Service, Statistics of Income Division (Individual Income Tax Returns 1991) has developed a measure of individual taxpayer income called 1979 Total Income designed primarily to facilitate analysis of changes over time across the 1980s (from 1979 through 1991). The total income concept, although not applied here, might facilitate future research tracing the determinants of the HMI deduction across time.[7]

Finally, regarding the use of income as a proxy for wealth: wealth functions differently from income in determining borrowing in that wealth reduces the need to borrow, where income increases the tax benefit of borrowing.[8]

3.3.3 Tax Benefit Variables

The federal tax expenditure for HMI deduction must be distinguished from its close relatives. First, caution must be exercised not to confuse the tax expenditure with the benefit to the taxpayer from the HMI deduction. This would refer to the pleasure or satisfaction actually received by the taxpayer. Economists might refer to this as the taxpayer s *utility* from his or her consumption of mortgage borrowing. It is not the goal of this study to measure the utility actually derived by an individual or household from any such consumption.[9]

3.3.3.1 Change in Dollar Amount of Tax

The dollar amount of benefit from the HMI deduction for each return filed is computed as the total tax for each return as filed under 1992 law, minus the total tax for

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[7]The calculation of Total Income for 1991 is available on request.

[8]The income measure used for this study is the taxpayer s adjusted gross income per the federal tax return.

[9]One could, however, assume that under the constraint of rational decision making, the amount of HMI consumed by a home owner will reflect his or her preference or need to borrow given housing choice decisions.

that same return without the benefit of the HMI deduction computed by recalculating the total tax after reducing itemized deductions by the actual HMI deduction claimed on the return.[10] The effect of the HMI deduction is removed from the tax on a static basis.[11]

A primary advantage of using the TAXSIM calculator (please see further discussion of TAXSIM in the Methodology chapters of this dissertation) is that the process of manually simulating tax liability as done by others (see Zorn (1989), Rosen (1979a) and Feldstein and Clotfelter (1976) for examples) is avoided. Further, TAXSIM includes a complete state tax calculator which automatically accounts for the effect of the interaction between state income tax and federal.

The interaction between state and federal tax assumes that current state tax is deducted against current federal taxable income. This simplification results in the timing of taxpayer state income tax deduction being off by one year in some cases since many taxpayers actually pay their state income tax (and thus are able to deduct it) in the year following the year in which the income was claimed. The effect on this study is assumed to be trivial.

A key observation regarding the HMI deduction benefit variable is that it is censored at zero on the low end (see subchapter 3.5 for further discussion). This censored distribution indicates the use of a Tobit regression procedure as discussed later in this

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[10]This calculation takes into account the taxpayer s standard deduction so that, for example, if removing the HMI deduction causes total itemized deductions to fall below the standard deduction, then the standard deduction replaces itemizing.

[11]Bezdek and Zampelli (1986) use a similar procedure for calculating tax expenditure.

subsection of this dissertation.

3.3.3.2 Change in Tax as a Percent of Total Tax

In order to take into account the effect of the change in tax relative to the taxpayer s overall federal income tax bill, the dependent variable described in the previous subsection (i.e., the dollar amount of benefit from the HMI deduction for each return) is divided by the taxpayer s total tax including as per the form 1040. The total tax amount used includes the effect of the HMI deduction benefit.

3.3.4 State Code Variable

A serious limitation of the tax database chosen for this study results from the disclosure avoidance procedure required to make the otherwise confidential tax information available for public use. The criteria used by SOI to identify returns where all geographic indicators (i.e., state and region codes) are zeroed out is multi-pronged. The state code is zeroed out for all returns with either AGI over $200,000, total income or loss of $5,000,000 or more, business plus farm receipts of $50,000,000 or more, or for non-taxable returns with expanded income of $200,000 or more. Thus, the sample is effectively truncated, and results must be interpreted with this in mind.[12] For the simplified regression model used to test hypotheses H1-H3 the state code field from the 1992 IMF is converted into a set of 52 0/1 dummy variables.

A second limitation in the tax database with respect to the state indicator variables

[12]Certain fields of these high income returns have also been blurred (an averaging procedure designed to further disguise the taxpayer) including state and local tax deductions, wages and salaries, and real estate tax deduction. All returns, regardless of income level are blurred for state and local tax and real estate tax deductions. The HMI deduction amount is not affected by the blurring procedure.

(closely related to the first) is that for smaller states such as Wyoming, Vermont, Montana, South Dakota and Alaska with 109, 170, 201, 226, and 232 state coded records, respectively (all of which exceed the largest territory), inadequate sample size may result in those states being dropped from the analysis. The lack of sample size, when interacted with the high end truncation, further compounds the problem caused by loss of usable cases because the cases lost will tend to be disproportionate in their HMI deduction benefit.

3.4 TAXSIM Simulator

The TAXSIM (Feenberg and Coutts (1993), and National Bureau of Economic Research (NBER) (1999)) calculator made available by the NBER is a FORTRAN program for calculating Federal and State income tax liability for individual returns. The program itself is not released. Table 5 provides the mapping between IMF data and TAXSIM input.

As Table 5 shows, although somewhat simplified, the list of TAXSIM input variables offer sufficient coverage to encompass ordinary and supertax brackets,[13] the earned income credit, the child care credit, the partial taxation of Social Security, and

[13]The 1989 federal income tax supertax was essentially an additional five percent tax on income between certain levels of relatively high income. For example, for married couples filing jointly, the tax was paid on income between $74,850 and $155,320. The effect of this five percent additional tax is to phase out the benefit of the fifteen percent bracket and personal exemptions for higher income taxpayers. This element of the federal income tax is expected to effect very few returns in the IMF sample, and have little impact on the results of this study.

other important features of the tax code.[14] Certain features of the tax code which are ignored by TAXSIM are expected to have minimal impact on the results of this study. They include: the capital gains deduction, limits (such as the limit on the amount of deductible long term capital loss per year), floors and ceilings on deductions, adjustments, tax preferences, etc.[15]

Feenberg (1997) suggests a methodology for validating the TAXSIM calculator.[16] Although such a validation study is beyond the scope of the present analysis, and its lack represents a weakness in the present study, the need for a validation study also represents a future research opportunity.

3.5 Regression Procedure

As mentioned previously, an important attribute of the HMI deduction benefit

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[14]Although not applicable during the years under study here, the secondary earner deduction for federal income tax is computed by TAXSIM.

[15]These are available in the full TAXSIM model, but are not included as part of Internet TAXSIM (the version used for the IMF portion of this study).

[16]The procedure described by Feenberg (1997) is designed to test the general accuracy of the TAXSIM Simulator, hence, focuses on the areas of known deficiency in the TAXSIM program. The issue of interest for the present study is more narrowly focused, and asks whether error in the simulator is correlated with the HMI deduction benefit which the simulator is used to calculate. To the extent the HMI deduction benefit is found not to be significantly correlated with the error, the case is made that the simulator is reasonably accurate for purposes of the present study. The procedure used to answer this question is a modification of the method suggested by Feenberg.

In the discussion that follows, *tax* refers to the taxpayer s total federal tax liability. The first step in the validation test is to compute the error term from the following OLS (Ordinary Least Squares) regression:

$$\text{Tax per IMF} = \quad + \quad _1(\text{Tax per TAXSIM}) + \quad .$$

variable is that it is censored at zero on the low end. This is to say that at the low end, the amount of benefit received by a taxpayer from the provision allowing for deduction of HMI is zero if the taxpayer either does not have sufficient deductions to itemize, or does not have HMI to deduct. Although practically speaking this variable is always positive, because it is theoretically possible for it to be negative the econometric literature suggests the use of a Tobit model for estimating regression models with this type of departure from the normal distribution is present in the dependent variable (Maddala (1992) provides references). The Tobit model assumes an underlying normal distribution of the dependent variable were it not for censoring.

3.6 Preliminary Hypotheses (H1-H3)

The hypotheses tested in this study explore the state-to-state differences in the HMI deduction tax benefit. The models used to test these hypotheses are not fully partialled, rather, they are designed to most efficiently address the question of whether or not state-to-state variation is present in HMI deduction benefit. For this reason, the testing in this subchpater is considered preliminary. If the results of these preliminary tests indicate the existence of significant state to state variation in the HMI deduction benefit, further testing (as in H4-H7) is justified.[17] All hypotheses below are stated in their research form.[18] The hypotheses of this part of the study are tested using the IMF

[17]This process of testing a general proposition, followed by a more detailed analysis is commonly referred to as testing up.

[18]Future research in this area should begin to examine the behaviors of some of the variables that are theoretically linked to the state-to-state differences in HMI deduction tax benefit. An hierarchical procedure to test up to a model which is approximately fully partialled should follow the present study.

tax database described above where the unit of observation is the 1992 individual tax return. Test statistics are derived from a series Tobit regression estimations.

First, H1 merely confirms the conclusion of prior research by testing for first order correlation between income and HMI deduction tax benefit. A simple bivariate correlation coefficient could be used to test the correlation of these two variables without regard to causality. Here, the model is simply:

HMIBENE = F(Income)

As discussed earlier in this dissertation, and without regard for any other possible factors that might affect the HMI deduction tax benefit, household income is predicted to be positively correlated with HMI deduction tax benefit. Thus, I expect to reject the null hypotheses in H1.

Because of the effect of the progressive rate structure, as well as that of other factors affecting federal income tax (such as filing status, number of dependents, etc.), each of the first three hypotheses control for the taxpayer s total tax bill by measuring the HMI deduction tax benefit in the dependent variable as a percentage of total income tax. The first three hypotheses, then are stated in an a and a b form where the former states the dependent variable in dollars of tax benefit, while the latter stated the dependent variable as the percent of this tax benefit to the taxpayer s total federal income tax for the year.[19]

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[19]Although not tested in the present study, compared to the a form (dependent variable stated in dollars), the b form (dependent variable stated as a percentage of total tax) of the dependent variable might be expected to demonstrate a weaker relationship for low and middle income taxpayers. This effect is expected to be the opposite, however, for high income taxpayers whose itemized deduction benefit is phased out. The phase out

H1 is stated below in its research form for both the dependent variable stated as a dollar amount, and as a percentage of total tax:

H1a: Income is correlated with HMI deduction tax benefit, as a dollar amount.

H1b: Income is correlated with HMI deduction tax benefit, as a percentage of total federal income tax.

It is clear that H1a examines the dollar amount of tax difference for the household. Because the tax benefit is measured as the dollar amount, it also represents the amount of federal tax expenditure per household, or more accurately per taxpaying unit.

Although discussed in more detail in a later section, due to the simplicity of the model, H1 could be tested using a simple ANOVA procedure. Rather, though, a regression procedure is used. As will be seen later, the regression results of H1 testing will be used in testing H3 as well.

H2 tests for first order correlation between HMI deduction tax benefit and the taxpayer s state of residence. Stated in their research form, H2a and b are as follows:

H2a: The HMI deduction tax benefit, as a dollar amount, varies significantly from state-to-state.

H2b: The HMI deduction tax benefit, as a percentage of total federal income tax, varies significantly from state-to-state.

In general terms, the H2 model is as follows:

HMIBENE = F(State of Residence)

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effect is partially lost with the IMF database due to data censoring or blurring of the data (for taxpayer confidentiality purposes) at AGI above $200,000. Blurred cases are omitted from the study because state of residence is not known for these cases.

Based on the numerous differences between states with the potential to impact HMI deduction benefit (including that of differences in income), H2a and b are expected to show a significant, positive correlation between the set of state variables and the dependent variable.

As with H1, H2 could be tested using an ANOVA procedure. As a matter of preference, however, and to allow for a bit of additional information to be gleaned from the analysis, a regression approach is used.

In terms of federalist/equity implications, rejection of the null hypothesis in H2a indicates uneven distribution of federal tax expenditure across states without considering the effect of the progressive rate structure. Rejection of H2b, having controlled for the effect of the progressive rate structure, would make a stronger statement regarding the degree of uneven distribution indicated (i.e., since tax benefit would be expected to be higher in states whose residents pay higher federal income tax due to the effect of the progressive rate structure on tax liability). Such an uneven distribution is believed (anecdotally) to be commonly accepted on the grounds that it is driven by differences in incomes across states. This common belief is the basis for H3.

Finally, H3 tests whether the HMI deduction tax benefit varies significantly from state-to-state after partialling out the effect of income on tax benefit.

H3a: Controlling for income, state of residence makes a difference in the HMI deduction tax benefit, as a dollar amount.

H3b: Controlling for income, state of residence makes a difference in the HMI deduction tax benefit, as a percentage of total income tax.

By measuring tax benefit as a percent of total income tax, H3b would control for factors other than income that affect the amount of income tax. For the present analysis of the HMI deduction, the method considered to accomplish Susswein s (1994) objective of controlling for the effect of the progressive rate structure is through the use of change in average or effective tax rate associated with a change in the HMI deduction, or simply to analyze the deduction amount, thus eliminating the impact of any rate schedule (as in Tax Analysts (1995d), discussed in section 2.1.3 Distribution of the HMI Deduction Benefit, of this dissertation).[20]

In terms of the methodology used to test, a partial *F*-test on the incremental HMI benefit explained by the set of state dummy variables representing state of residence provides the test statistic in H3. The H3 restricted and unrestricted models respectively are as follows:

HMIBENE = F(Income)
HMIBENE = F(Income + State of Residence)

Rejection of the null hypothesis in H3a or b indicates the existence of an uneven state-to-state distribution of the HMI deduction tax benefit beyond that which is caused by the distribution of income across states.[21] Such uneven distribution indicates the need for further exploration in at least two directions: (1) examination of the characteristics of states that drive the differences (discussed in H4-H6), and (2) identification of which

[20]This method is used by CBO and others, and is discussed by Davis (1991). It could be, but is not applied in this dissertation.

[21]The likelihood of rejecting the null hypothesis might be increased by grouping or clustering states into regions by key characteristics.

states gain and which lose as a result of the HMI deduction differences (discussed in H7).

The regression estimated in testing H3 also provides information on which states residents gain and which lose as a result of the HMI deduction. The reference group in the set of state dummy variables was Colorado since its average HMI benefit per tax return is closest to the national average. Any state with a positive coefficient on its dummy variable benefitted more than the average, and visa versa for those states with negative coefficients.

Without regard to economic significance (i.e., without commenting on the significance of the dollar amount of the difference, and whether the amount makes an economic difference to the taxpayer), a state s HMI deduction benefit varies significantly from the national average if the coefficient on its dummy is statistically significance. This result is reported below.

Finally, characteristics of individuals and their state of residence driving differences in HMI deduction benefit is the topic of the next part of this study. This next part of the study must, by necessity utilize a data set with the demographic information lacking in the SOI Individual Model File used in this first part of the analysis.[22]

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[22]It might also make sense to examine the possibility that state-to-state variation in the HMI deduction is not the same across all income levels as the following:

Hypothesis: State-to-state variation in the HMI deduction tax benefit is the same for all income levels.

Significance of the coefficient on this (income*state of residence) interaction would provide a test of this hypothesis. The following multiple regression model would be estimated:

HMIBENE = F(Income + Income*State of Residence + State of Residence)

Recall the theory posited earlier, that the decision process that includes mortgage choice is not the same for everyone. Particularly, where a poorer household faces a choice between renting and buying in which a mortgage is the only means of financing, the mortgage choice is the buy choice. Because of the existing federal tax structure, the poorer family may receive little or no tax benefit from the HMI paid, whereas a wealthier household first decides (probably on the basis of a different set of decision criteria) to buy, then secondly, selects the means of financing (e.g., one of which is the use of a mortgage secured by the residence). It is far more likely that the wealthier family will benefit taxwise from most or all of the HMI expense incurred. Also recall that in the context of federal grants-in-aid, Weinstein (1979) theorizes the existence of larger cost of living differences at higher income levels than at lower. On this basis, it is predicted that the differences across states will be greater for higher income taxpayers then for lower.

CHAPTER IV

METHODOLOGY - CENSUS ANALYSIS

4.1 General Overview and Description of Causal Analysis

As stated in the introduction, the strategy employed in the empirical analysis is to use a causal hierarchy to first identify significant sets of factors affecting the distribution of HMI deduction benefit across states. By controlling for the effects of personal and identifiable state characteristics on HMI deduction benefit, the possible existence of a residual socio-political force is tested. The primary data sources are the 1990 Census of Population and Housing 5% Public Use Microsample (PUMS) as well as 1989 tax data extracted from the Statistics of Income, Individual Public Use Tax File, Level III Sample. Other sources include the Federal Housing Finance Board (FHFB), Mortgage Bankers of America (MBA), U.S. Department of Housing and Urban Development (HUD), and Bureau of Census, Statistical Abstracts (U.S. Census Bureau, 1999). Actual hypothesis testing employs regression (Ridge, Tobit, and ordinary least squares (OLS)) analysis.

The data analysis performed in this preliminary part of the study concludes the process discussed in Chapter III (i.e., the Hartwig and Dearing (1990) four-step exploratory data analysis process).

Given that the results of the IMF analysis (see Chapter III for methodology and subchapter 5.2 for results) indicate significant variation in HMI deduction benefit across states and, thus, the existence of a resource transfer between states, a next logical step is the development of a causal hierarchy for the process of benefitting form the HMI deduction. A causal hierarchy analysis (Cohen and Cohen, 1983) identifies those factors that contribute to variation in the HMI deduction tax benefit. The factors of interest in the present study are those which contribute to variation in the HMI tax deduction benefit.[1] The first set of hypotheses tested in the present study examine the causal effects of a related set of variables (organized in a causal hierarchy) on the HMI deduction benefit.

4.2 Data

4.2.1 Data Sources and Issues

4.2.1.1 Census (PUMS) Data

The basic household data for this analysis begins with the 1990 Census of Population and Housing 5% Public Use Microsample (PUMS) state files for CA, CO, FL, KY, IA, IL, NY and TX. These data, once converted to tax returns for those households, are combined with actual tax return statistical data, other demographic data, real estate and mortgage market data, as well as tax and legal data based on state of residence. The remainder of this subsection discusses the issue of deleted cases.

Regarding deleted PUMS cases, from the set of all persons in the PUMS, all

[1]Because it is hypothesized that certain household characteristics (income, for example) will tend to vary more from state-to-state at the higher income levels, in testing state-to-state variation it also may be informative to examine this variation at different income levels (say low, medium and high). One way to test the cross income bracket significance of a variable would be to interact the variable with an income measure (such as a set of dummy variables indicating an income group such as first, second, third or fourth quartile). Once identified, these factors could be individually tested for cross-state variation.

group quarters and institutional cases are dropped from the sample since the data allows no clear way to identify home ownership status for these cases. Finally, within these households, any person (roomer, boarder, or housemate, etc.) who was likely to be paying rent to the primary householder, and was also likely (based on age and income) to file their own separate individual tax return, was also dropped from the sample. The remaining households are headed by the primary householder of their place of residence, who is assumed to be the household s either single or joint taxpayer. These taxpayers either rent or own their residence (where the place of residence can be either a single or multiple housing structure or mobile home). If they own, they may or may not have a mortgage.

Approximately 3% of households sampled report the presence of a subfamily. All such cases are deleted from the sample to avoid the need for arbitrary assignment of dependency exemptions between the household head and the subfamily head. The single largest group of subfamily members are grandchildren of the householder, followed by children of the householder. These two groups, combined with other relatives of the householder constitute the vast majority (nearly 90%) of all subfamily members. In terms of dependency exemptions, for purposes of this study, subfamily members are treated the same as any other household member having the same relationship to the head of household. In those cases where this assumption is incorrect, the number of exemptions claimed on the head of household s tax return is overstated. Since the actual dependency relationship between these household members is unknown, the alternative (short of either dropping these persons from the household, or dropping the household from the sample) is to treat all such persons as non-dependents. In either case, since the effect of this decision on the results of this analysis is assumed not to be of major significance, and since leaving these individuals in the sample facilitates further analysis (as part of future research), these individuals remain in the sample.

As with any survey data, some Census questions may be difficult for subjects to interpret or respond to correctly. Incorrect interpretation/response to certain key questions could have a material impact on the results of this study. In order to avoid problems with the allocation of home costs between personal and business uses, housing units with a combined residential and commercial or significant agricultural sales use could be dropped from the sample. For the present analysis, since the amount of mortgage interest deduction is based on statistical data rather than subjects response to the Census questionnaire, these cases are left in the sample.

4.2.1.2 Tax Return Data

Statistical data from the Statistics of Income, Individual Public Use Tax File Level III Sample are provided for this study by Citizens for Tax Justice (CTJ). The dependent variable as well as two independent variables for the regression (one, the average amount of state income tax payed by taxpayers claiming a deduction, and two, the amount of local income tax payed which is derived directly from the state income tax measure) are derived from the 1988 Individual Public Use Tax File Level III Sample. This subsection describes the Level III Sample, as well as the computation of the HMIB (Home Mortgage Interest Benefit) variable.

In comparing the IMF used in the first part of this study with the Level III Sample used here, one significant difference is that upper income (AGI greater than $200,000) returns are included in the Level III sample (recall that the IMF had no upper income returns), however, these returns are actually synthetic. The synthetic upper income returns are developed by SOI in order to allow for the inclusion (if only on a statistical basis) of such returns, while at the same time preserving the confidentiality of all taxpayers. It is important to point out that due to limitations in the underlying data, not all 204 cells are filled for all states, resulting in a possible loss of cases.

In terms of sample size, of the 109,473,036 individual Federal income tax returns filed for Tax Year 1988, the Level III sample selects 365,225 returns on a stratified (by AGI) random basis. These include 364,562 lower and middle income and 663 (13 from each state plus other areas) upper income (AGI > $200,000) returns. Recall that the 1992 IMF used in the first part of this dissertation was void of upper income returns. For the eight states selected for this analysis, the number of returns on which the CTJ statistics are actually based ranges from a low of 3,576 lower and middle income, and 4,373 upper income returns not including the 13 synthetic returns (discussed above) for Iowa, to 44,352 lower and middle income, and 117,478 upper income returns not including the 13 synthetic returns for California (SOI 1988). Averages for these returns are used as a basis for certain variables used in the fully partialled model (including the dependent variable, discussed below).

The starting point of the CTJ variables (which includes the HMIB dependent as well as the ASIT (Average State Income Tax Deduction for the household s cohort group) and LOCIT (Average Estimated Local Income Tax Deduction for the household s cohort group) variables) is the Internal Revenue Service 1988 Level III Sample. The Level III Sample was selected as part of the Statistics of Income program in an effort to make publicly available statistical information on Form 1040, 1040A, and 1040EZ individual tax returns filed for 1988. CTJ has then applied an update procedure to convert the 1988 returns to approximate 1989 returns. Detailed information on the update procedure is available through CTJ (CTJ 1999). CTJ has then applied their own tax simulator to the approximated 1989 tax return to derive the average reduction in federal income tax from the deduction for home mortgage interest for all individual filers. The actual HMIB values matched with the PUMS-based tax returns are based on a 3*2*2*17 = 204 cell classification.

4.2.1.3 Combining PUMS and Tax Return Data

Through the application of a series of assumptions focusing primarily on the relationships between household members, the PUMS housing/person records remaining after deletion of certain cases (discussed above) are collapsed into a set of hypothetical tax returns for the householders. The detail of the conversion logic is available upon request. In summary, however, based on responses to the 1990 Census of Population and Housing questionnaire, the state of residence, marital status, number of dependents, age, and income of the taxpayer (previously referred to as householder) and spouse (if any) are approximated. These five variables serve as the basis for combining PUMS records with data derived from actual tax returns.[2] In addition to these five characteristics, vital and other personal characteristics of the householder and spouse are gathered and used as

[2]Luttman (1990) discusses database merging with tax data.

right-hand-side variables in the regression model (the detail of which is included below).

In developing the approximated tax return records for the regression analysis, these four characteristics of the householder/taxpayer (marital status, number of dependents, age, and income) form the basis for statistically merging 1989 tax data from the Individual Public Use Tax File Level III Sample, with the Census-based tax return records. Three statistics taken from the Level III Sample are used in the analysis. These tax statistics were extracted from the Level III sample, and provided by Citizens for Tax Justice (CTJ). Table 11 lists and briefly describes the CTJ variables used in this analysis, while Tables 12 and 13 describe the PUMS/CTJ matching process.

4.2.2 Model Variables

Descriptive (univariate) statistics for each of the variables included in the model are provided in Table 14. This section discusses these variables in the context of the causal model.

4.2.2.1 Dependent Variable (HMIB)

As discussed above, the HMIB dependent variable (the average reduction in federal income tax from the deduction for home mortgage interest for all individual filers) begins with averages extracted from the Internal Revenue Service 1988 Level III Sample which CTJ has updated to simulate 1989 returns. These averages have been merged with PUMS data based on the 3*2*2*17 classification described above. Based on the 204 cell classification, the CTJ value is then assigned to the HMIB variable for cases with a mortgage (as identified in the PUMS housing record) and a value of zero is assigned for all others. Thus, the HMIB variable is used to approximate the actual mortgage interest deduction benefit.

Following this procedure, the amount of deduction benefit assigned for returns with itemized deductions is understated (since the aggregate deduction benefit amount is spread over returns with and without the deduction). This understatement should have the effect of biasing against finding results as variability of the dependent variable is reduced. To overcome this shortfall, two alternative procedures for preparing the dependent variable were considered. The first alternative was to use the average tax benefit amount for only those returns with the mortgage interest deduction. This would have the benefit of not averaging the benefit over returns without the deduction (as is done in this study). By assigning the higher deduction benefit amount (i.e., that based on only returns with the deduction) to all returns based on the presence of a mortgage, those returns with a mortgage but without sufficient itemized deductions to actually benefit from the mortgage interest deduction are assigned a benefit when none is actually present. The added variability introduced by this procedure would tend bias in the direction of finding significance results. For this reason, the more conservative procedure was followed.[3]

Table 15 provides descriptive statistics for the dependent variable by state, while Table 16 provides bivariate correlation coefficients (Kvanli *et al.* 1989) for all model

[3]An alternative (and preferred) procedure considered for producing the dependent variable was to use the actual mortgage interest deduction amount along with other characteristics of the tax return/household as input to the TAXSIM simulator. Then, using a procedure similar to that followed in the first part of this study (please see the section of this study on the analysis of the 1992 IMF dataset), create a tax benefit amount to be used as the dependent variable. This added step can be performed as future research, and the results compared with those of the present study.

variables.

4.2.2.2 Personal Characteristics

The set of personal characteristics of the taxpayer are divided for discussion purposes into a set of what the Census literature calls vital characteristics, followed by a set of other personal traits.

4.2.2.2.1 Vital Personal Characteristics

The age, race, and relative income of the household head are important factors in predicting the value of the house. To the extent that these factors vary significantly from state to state (as in the case of age) or regionally (as in the case of race), they are expected to be causal factors in any between-state differences in HMI deduction benefit. Also, because factors such as race and sex of the household head may be associated with discrimination (both in the housing and mortgage markets) that may also vary by state, or region, their importance for the present study is increased. Most studies in this area use a dummy variable for the characteristic (for example, age, sex, race, etc.) of the head of household to factor in the anticipated effect on the decision process. These variables may be contributing factors in any or all of the processes being modeled (e.g., tenure choice and housing quality decisions, as well as the mortgage choice decision).

Each of the following characteristics describes the individual head of the household. The question of interest in this study is whether in aggregate, they constitute an important feature of the state of residence. Thus, by examining differences across states, a significant innovative aspect of this dissertation is that these characteristics are modeled.

Age

The first vital characteristic modeled as a causal variable with respect to home mortgage interest deduction benefit is age. Householder/spouse age comes directly from the PUMS person records. All other factors held constant, HMI deduction benefit is predicted to increase as age of the householder increases for ages ranging up to close to retirement.[4] As the householder and the mortgage mature, both housing needs reduce, and mortgages tend to produce less interest expense. The result of this change is that HMI deduction benefit begins to decrease as age continues to increase. As modeled, the overall direction of the age effect is not readily predictable. The model includes both the average age of all residents for the particular state, as well as the age of the householder. In the case of married/joint taxpayers, the age of the highest income spouse is used.

The age of the head of household may have multiple effects. First, as age advances, normally until retirement, so does human capital, or the ability to consistently earn a higher wage, and in turn wealth. Given the data available for the present study, age is probably the best proxy for wealth. With increased wealth, the value of the home is expected to increase (in part because of an assumed correlation between resources and ability to purchase a home, but also because the home, as an asset, is part of the owner s wealth). At the same time, as wealth increases, the need to finance the purchase of the home is reduced. Thus, the amount of mortgage interest is also reduced. This assumes,

[4]The actual age of retirement is both difficult to define and even more difficult to predict. Although this study makes no attempt to determine and correct for retirement age beyond controlling for both age and its square, this issue should be the subject of future research.

of course, that the funds raised through the use of debt secured by the home are, in fact, used for the home[5]--that is not always the case (e.g., Jones 1994).

Additionally, to the extent that the average age of household heads is significantly different from state to state, the average HMI deduction benefit may vary. For example, in a states such as Florida and Arizona where, due to their popularity as retirement communities, the average age of residents is above the national average, the average age may be a factor driving any difference in average HMI benefit.

Sex

Sex of householder is also provided directly through the PUMS person records.

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[5]In terms of the effect of increased wealth (assumed to be associated with increased age) Jones (1986, 1994, 1995a), using Canadian microdata, and others (e.g., Ioannides (1989)) provide empirical specifications of debt/equity structures to distinguish consumption from investment motivated home mortgage activity, attribute a strong negative correlation found between wealth and mortgage borrowing to be an indication that wealth and mortgage borrowing are substitutes in financing household portfolio objectives. Manchester and Poterba (1989), however, using Survey of Income and Program Participation (SIPP) (U.S.) data interpret the same negative coefficient as indicating the opposite--that mortgage debt is used primarily to finance consumption. Manchester and Poterba conclude that 75% of second mortgage borrowing and 30% of new borrowing from refinancing first mortgages is used to finance consumption. Maki (1995 and 1996), using the Consumer Expenditure Survey panel and focusing on 1986-1990, finds strong evidence that high income households engaged in portfolio shuffling from consumer debt to home mortgage debt in response to the TRA 86 phase out of deductibility of interest paid on consumer debt. Both conclusions, however support the proposition that not all mortgage debt is driven strictly by housing choice decisions. In fact, one could reasonably question whether the housing choice decision was not itself partially driven by expected future borrowing needs.

None of the literature in this area considers the role of state specific lending restrictions. For example, although Texas has since repealed its long standing homestead laws, in 1990, Texas residents were prohibited by law from using their homes as security for non-housing related debt. Thus, the interaction of the state variable with age (as a proxy for wealth) may prove significant in determining the amount of second, and to a lesser extent, primary mortgage borrowing.

The PUMS person variable (SEX) is used as coded with male equal zero and female equal one. The model includes both the sex of the individual householder as a vital characteristic as well as the percent of males for the particular state of residence as a state characteristic. In the case of a married householder, the sex used for this study is that of the spouse with the highest wage income. For single householders, being male is assumed to be an advantage in being positioned to benefit from HMI deduction because of higher income and ability to buy and finance a home. With SEX=0 for males, the coefficient on this variable should be negative, reflecting the negative relationship between being female and HMI deduction benefit. For married householders, I am unable to predict the effect of sex (i.e., that of the higher income spouse) on the dependent variable, thus sex may not be a significant factor. Overall, sex should be mildly significant and negative.

Rosen (1979a), includes the sex of the head of household as a causal variable in his housing choice model because demographic differences may influence preferences between housing and other goods. Rosen (1979a) finds a significant negative influence in both models of tenure choice, as well as a model of quantity of housing services demanded by home owners when 1=female head of household, 0=not. The variable continues to be widely used in similar models of housing choice literature and mortgage choice (similar to the use of the race variable). Jones uses sex as an explanatory variable in each of the studies mentioned in the previous discussion of the race variable (in both his U.S. and Canadian studies). Although the sex discrimination issue is not widely examined in the housing and mortgage choice literatures, discrimination on the basis of sex is a problem that is specifically addressed by the Fair Housing Act and enforced by HUD. All other factors held constant, males are more likely to be home owners, and will find it easier to obtain mortgage financing, and thus, benefit from HMI deduction.

Race

Race of householder or spouse is also derived directly from the PUMS person record. The model includes both the race of the householder as a personal characteristic as well as the percent of residence of each state. With a married householder, the race used here is that of the spouse with the highest wage income without regard to sex.

Rosen (1979a) includes the race (white, non-white) of the head of household to control for tastes in his owner-occupied housing and finds significance with some model specifications. Henderson and Ioannides (1986) find non-white race to be a significant negative factor in a joint tenure choice, and housing consumption decision model. Likewise, Goodman (1988) finds race (dichotomous white, non-white) to be significant in determining housing price, permanent income, tenure choice, and housing demand. Linneman and Wachter (1989) use two dichotomous dummies, an Hispanic, non-Hispanic, as well as a black, non-black to model the effects of borrowing constraints on home ownership. In short, the housing choice literature strongly supports the inclusion of race as a causal variable in determining HMI debt benefit.

Jones (1986), using Canadian micro cross-section data, does not model race as a causal variable in determining home mortgage debt; and he again leaves race out in his 1995b study of wealth and tax effects on demand for mortgage debt in Canada. Jones does, however, include a dichotomous (non-Hispanic Caucasian, other) race variable in his 1991 analysis of home mortgage debt demand using U.S. and Canadian data; his 1994 analysis of mortgage debt financing of nonhousing investments using U.S. data; and again in his 1995a study of tenure choice in the United States and Canada.

The literature on mortgage redlining (e.g., Ostas 1985), however, suggests that race may be an important factor in mortgage supply (although demand differences may also be present) decisions. In addition, this effect is expected to be more pronounced regionally within the United States

For those states where racial bias exists, the non-white race of the household head is expected to have a significant negative effect on the HMI benefit when interacted with a social environment of racial bias.

4.2.2.2.2 Other Personal Characteristics

Classifier Income

Income is the first personal, non-vital attribute modeled. The income measure used for this study is called Classifier Income (CLASSINC). Classifier Income is derived from the PUMS person records and approximates taxpayer gross income. Table 17 provides a description of the CLASSINC variable.

From the PUMS person record, the following categories of income are gathered for taxpayer and spouse to create the comparable income classifier: wages or salary income, nonfarm self-employment, farm self-employment, interest, dividends, and net rental, social security, public assistance, retirement, and all other income. In addition, the income of children under fourteen includable on the parent s return is added to the parents income. In computing classifier income, probably the single most significant deviation from tax-basis income is the omission of capital gain income in computing classifier income. This difference arises from the fact that income reported on the Census includes only recurring types of income, of which capital gains are assumed not to be part.

Educational Attainment

All the studies mentioned as using the race variable also model for the education level and occupation of the head of household, although the form of representation varies. Jones (1986) and others use a continuous variable to indicate the education level attained by the head of household, and a series of six dichotomous dummies to represent various occupations. Jones (1994) uses a single dichotomous variable to indicate whether the head of household either has at least 16 years of schooling and is working in a managerial/professional position, or not. Educational attainment as well as professional/managerial job status are predicted to be associated with a greater tendency to own, increased housing service demanded, and increased mortgage demand.

Householder educational attainment data are provided by the PUMS person record. The actual Census question regarding educational attainment places the subject in one of the seventeen categories shown in Table 18. The actual PUMS variable (YRSCH) is recoded to create the following set of dummy variables: (1) Non-high school graduate, no diploma, (2) High school graduate, diploma or GED, (3) Some college, with either no degree or associates degree, (4) Bachelor's degree, and (5) Graduate degree. Non-high school graduate is the reference group. Coefficients on the other four groups are expected to be positive with magnitude and significance increasing as education level increases. In the case of a married householder, the education used for this study is that of the spouse with the highest wage income without regard to sex.

All the studies mentioned above as using the race variable also model for the education level of the head of household, although the form of representation varies. Jones (1986) and others use a continuous variable to indicate the education level attained by the head of household. Jones (1994) uses a single dichotomous variable to indicate whether the head of household either has at least 16 years of schooling and is working in a managerial/professional position, or not. It is expected that as educational attainment increases, all things constant, HMI deduction benefit will increase as a result of improved ability to purchase a home and obtain financing, as well as take advantage of itemized deductions.

Occupation

As with higher educational attainment, professional/managerial job status are predicted to be associated with a greater tendency to own, increased housing service demanded, and increased mortgage demand. As mentioned in the prior section, Jones (1994) uses a single dichotomous variable to indicate whether the head of household either has at least 16 years of schooling and is working in a managerial/professional position, or not.

Information on the occupation of the householder/spouse is provided by the PUMS person record (the details of which are found in Appendix I of the PUMS Technical Documentation; see U.S. Dept. of Commerce, 1993). The actual Census variable (OCCUP) provides a highly detailed classification which is recoded to form the following set of dummy variables: (1) Managerial and Professional Specialty, (2) Technical, Sales, and Administrative Support, (3) Service, (4) Farming, Forestry, and Fishing, (5) Precision Production, Craft, and Repair, (6) Operators, Fabricators, and Laborers , (7) Military , and (8) Experienced Unemployed Not Classified (Last Worked 1984 or Earlier). Last Worked 1984 or Earlier is the reference group. In the case of a married householder, the occupation used for this study is that of the spouse with the highest wage income without regard to sex.

The related housing/mortgage literature also uses head of household occupation (again, in various forms of representation) as an explanatory variable. Jones (1986) and others use a series of six dichotomous dummies to represent various occupations. Jones (1994) uses a single dichotomous variable to indicate whether the head of household either has at least 16 years of schooling and is working in a managerial/professional position, or not. Professional/managerial job status is predicted to be associated with a greater tendency to own, increased housing service demanded, and increased mortgage demand.

Marital Status

Marital status of the householder is provided by the PUMS person record through the presence of a household member identified as the spouse of the householder. This relationship is identifiable through the relationship to householder variable (RELAT1). The detail of the RELAT1 variable are provided in Table 19.

Once a household member is identified as a spouse, a marital status variable (MARSTAT) is coded to reflect this status. Simply by virtue of the fact that two people occupy more space than one, it appears reasonable to expect that housing expenditure by a married couple would exceed that of any other filing status (although not necessarily on a per capita basis). This is independent of the likelihood that a married couple is more likely than any other status to have dependents and, thus, a higher demand for housing (please see the following discussion of dependents). All other factors held constant, married taxpayers as a taxpaying unit are expected to enjoy higher levels of HMI deduction benefit than their single counterparts.

Dependents

Dependency status is determined through a series of statements approximating IRC dependency exemption rules (the actual code is available on request). A limitation to the use of PUMS data is that dependency status is only possible for individuals who are household members living in the household. By the simple logic that more people occupy more space it might be reasonable to expect that a larger number of dependents would be associated with increased demand for housing. This logic, however, presumes a certain level of planning on the part of parents as well as a particular set of priorities. It is not beyond reason to believe that not everyone plans well for added dependents. Further, as a house and dependents are competing uses of limited household income, even in the presence of planning it is likely that a trade-off exists between more dependents and a larger house. Thus, the sign of this variable is difficult to predict.

4.2.2.3 State Characteristics

A significant number of factors are suggested by the literature as potentially contributing to the variation in HMI deduction benefit. Thirty one of these state characteristics are selected for use in this study. In order to reduce the number of variables in the model, and avoid the predicted multicollinearity problems associated with this quantity of often highly related variables, these thirty one variables are factor analyzed and the first five components (explaining 81% of the total variance of the set) are used in the hierarchical model to represent the set. This subsection of the study discusses the actual thirty one variables, and at the end, provides a brief discussion of the factor analysis procedure as well as a description of the results. Table 22 provides basic descriptive statistics on the variables in the set.

4.2.2.3.1 Personal/Individual Demographics

Although a number of individual characteristics of the householder are captured as household level variables, the variables listed in Table 20 as Personal Characteristics represent the state averages for these attributes. A few personal characteristics in this subsection describe the general population of the state, where the corresponding variable from the previous subsection describes the individual head of household.

4.2.2.3.2 Housing Market and Economic

The state statistics listed in Table 20 are modeled as explanatory variables in order to reflect the demographic makeup and economic conditions of the taxpayer s state of residence. Although this group of variables is general in terms of its descriptive capacity, the housing/tenure choice and mortgage choice literatures all support their inclusion as causal characteristics in the present analysis. The table also indicates the source of each variable. Although numerous other variables are modeled under this heading, this subsection focuses primarily on home value, selected owner costs (not modeled), and housing discrimination.

Home Value and Selected Owner Costs

Clapp (1987) outlines the following set of general data requirements for determining the value of a house: trends in environmental conditions, employment, population composition, and public safety and health programs. Environmental conditions include such factors as fuel adequacy, mass transit facilities, and pollution control efforts. Employment includes basic areas as well as levels of employment. Population composition considers age, household size, nationality and ethnicity, as well as the urban-rural balance. Finally, public safety and health programs are those aimed at such areas as planning, zoning and engineering, public assistance for low-income households, as well as those programs aimed at assisting middle-income households. These factors are assumed to be impounded in the housing value estimated for owner occupied homes in the Census database.

Further, in terms of specific features impacting marketability of a particular home, the following is a summary list: style of home, shape of lot, location (corner, etc.), front footage, site topography, kitchen features, mechanical features (such as heating and air conditioning), external attributes, bedrooms, baths, privacy, public transportation, school district, and general layout (Clapp 1987). Murdock and Hamm (1988) provide a more comprehensive checklist of elements of market analysis for evaluating a particular property (site location) decision, many of which overlap, and many of which do not apply at the state level of analysis.

Murdock and Hamm (1988) identify the following factors as being among the most important demographic factors affecting residential real estate markets: (1) population size, past rate and source of growth (whether in-migration or natural increases); (2) population age structures; (3) household, family and marital characteristics; and (4) racial and ethnic characteristics.[6]

These effects are important for the present analysis in that, up to a certain level, the greater the cost of a house, the greater the expected mortgage amount. As with legal/regulatory factors, however, market measures are assumed to factor in these effects. Market factors such as the value of a house as well as a housing cost index are commonly used throughout the housing demand and tenure choice literature.

The higher the cost of housing the more a household must spend to achieve a given standard of living. Assuming tastes to be constant across states (except as controlled for elsewhere in the model) this is expected to cause an increase in housing expenditure and HMI deduction benefit. Home value as estimated in the Census database is used as a proxy for cost in the present study.

As examples of the prior literature, in computing their individualized price of owning, Henderson and Ioannides (1986) assume a real interest rate (nominal interest rate less the rate of inflation) of five percent, and a rate of maintenance of .75% to be

[6]In providing a detailed description of the Texas real estate market, these authors emphasize change aspects of the demographic variables. Although a time series model has the potential for improved explanatory capability, the present study is limited to a cross-sectional analysis, and leaves a panel data analysis for future research. The latter three of these four variables in particular are used as explanatory variables consistently throughout the tenure choice literature. The Murdock and Hamm (1988) paper provides useful guidance on the measurement of these variables.

applicable across all MSAs (across the nation). The present study proposes to allow these rates to vary by state. Maintenance cost is assumed to be positively correlated with the age of housing stock as well as with the cost of the home. Maintenance cost is not being reported in the PUMS (and is not a Census question). It is, thus, omitted as it would merely be collinear with home value.

Housing Discrimination

In addition to the demographic variables normally included in a model of tenure/housing/mortgage choice processes, this study applies a direct measure of housing discrimination (variable named DISCRIM) derived from the work of HUD (HUD 1979).

The HUD study measures discrimination behavior in major MSAs (Metropolitan Statistical Areas).[7] The present analysis averages these measures for MSAs within the state to come up with an overall measure for the state. The study reports four discrimination measures each for both the housing rental and the housing sales markets.

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[7]A model designed by Wilson (1979) to evaluate the One Percent Sample of Neighborhood Characteristics created from the 1970 Census controls for two suburbanization (variation in the structure of urban areas) variables: (1) the percent of the metropolitan population resident outside the central city, and (2) the percentage of the labor force employed outside the central city. The present study using the 1990 Census will use similar controls.

Narwold and Sonstelie (1992), in estimating a probit model of housing tenure (to test tax arbitrage theory in the United States) use a dummy variable METRO, with a value of one to indicate the family lives in a metropolitan area or zero otherwise. The authors predict that METRO should have a negative coefficient because houses in rural areas tend to have a larger land to structure ratio resulting in less excess depreciation (i.e., the excess tax deduction for depreciation over economic depreciation). As Linneman (1985) also points out, excess depreciation is a positive factor in a property owner s decision to rent out the property. For purposes of the present study, it will be informative in observing variation across residents of the fifty states to include a measure of urbanization such as the percentage of residents living in metropolitan versus rural areas of the state.

The measures reported are: (1) no discrimination, (2) whites favored, (3) blacks favored, and (4) overall discrimination. The first three measures sum to 100 for each MSA studied, and the overall discrimination measure is the difference between the second and the third (and is thus a measure of the net difference in treatment between blacks and whites). For the present study, the second measure (whites favored) is the most useful. Table 21 shows the actual HUD measurements, as well as the MSAs included for each state and the average measures for each state.

In the present study, of primary interest is the effect of discrimination on the dependent variable (HMI deduction benefit). In order to model this effect, the discrimination measure (percent of cases where whites were favored) is interacted with the percent of blacks in the population. The resulting interaction measures the potential lost benefit for a particular state resulting from discrimination. It is important to note that vacancy rate has been partialled out apart from the discrimination measure because higher vacancy rates allow for the opportunity to discriminate. Unfortunately, the HUD study did not measure discrimination in any cities in either Colorado or Iowa. These states were assigned discrimination measures equal to the national average based on a comparison of their region with the nation.

4.2.2.3.3 Mortgage Market Legal/Regulatory Characteristics

Of particular interest in the present study are state housing market and related legal conditions. The set of variables shown in Table 20 is used as a proxy for the residential real estate and home mortgage markets. The basic approach taken here is that market conditions are considered to provide a proxy for actual housing market and related legal conditions. The one exception is use of a single variable to reflect the unique nature of Texas homestead laws (which, although in existence in 1990, have since been repealed) through the MORTGAG2 (please see Table 20).

To the extent that there are legal/regulatory differences from state to state, these differences may contribute to differences in availability of the HMI deduction between residents of the various states. Housing and mortgage market factors including legal and economic conditions as well as non-housing costs are posited to be key in determining the level of HMI deduction benefit enjoyed by federal income taxpayers.[8] Demographic and vital factors that vary from state to state should also tend to result in differences in the overall ability of state residents to enjoy home ownership as well as the advantage of the ability to borrow. Finally, differences in state income tax, particularly housing related provisions as with the federal income tax system, may influence housing decisions of the state residents, and thus their ability to benefit from the federal HMI deduction. These differences between states provide the motivation for the federalist perspective adopted for the present analysis.

In terms of the prior literature, Jones (1993), in a contribution to what would be considered the mortgage demand literature, examines differences in mortgage default

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[8]Although not modeled here, non-housing costs are expected to impact the housing quality decision in that to the extent that the household must use its scarce financial resources for non-housing expenses, there is less left over for housing.

All things equal, the higher the non-housing cost of living the less the household has to spend on housing. Thus, controlling for the cost of housing, the partialled effect of non-housing price levels is expected to be negatively correlated with housing expenditure and HMI benefit. In the present study, a cost of living index is estimated based on the state of residence as well as metro/non-metro characteristics for each household.

between the Canadian provinces of British Columbia and Alberta. This study is unique in that it attempts to model some of the differences between provinces that are known to exist in the legal environment. When compared with previous studies, a significant advancement with the Jones (1993) model is in the recognition of state level differences in the home mortgage environment.

It is important to realize that regulation is likely to play an important role in any market. In the present study, federal regulation of housing and mortgage markets, to the extent that it eliminates or reduces state specific factors, is assumed to reduce the differences between states that would tend to directly impact the home purchase and mortgage decisions. This study assumes that market measures impound these differences. Detailed analysis of the effects of specific regulatory provisions is left as the topic of future research.

Even though the present study uses market measures to proxy for the underlying factors of the housing decisions, it is important to take at least a theoretical look at that underlying environment. In the prior literature, most of these factors are assumed to be stable across all geographic locations (with some studies oven assuming equality between nations). One contribution of the present study is that these legal/regulatory and state income tax factors are allowed to vary across states (although, as mentioned in subsection 2.4.2.2 State Income Tax, some cursory analysis of state income tax provisions in this area exists in the literature).

Mondor (1988), Alexander (1993), and others provide detailed commentary on the history of tremendous diversity between states in real estate finance and the laws that affect it. A review of this literature is available on request.

Historically, real property law has been the exclusive domain of the states. Given the changes that have taken place over the last sixty years, an important step toward identifying those differences that remain between states is to understand the role of the federal government in real estate finance, both as a regulator and a market participant. The courts have played an important role in determining when and to what extent federal law should displace diverse state real estate finance laws and impose uniformity in an environment that has been referred to as chaos. The present study simply uses the reported home value per the 1990 Census (as seen in Table 20) as its measure.

4.2.2.3.4 State and Local Tax

Due to the nature of this study, state tax characteristics are considered separately (even though they could otherwise be considered merely part of the overall demographic/economic composition of the state). In order to reflect the tax characteristics most likely to impact HMI deduction benefit, the variables shown in Table 20 are included on the right hand side of the causal model.

State Income Tax (SIT)

The average amount of SIT paid for all individual federal filers with a SIT itemized deduction is derived from the CTJ dataset. Since the presence of SIT (a Federal itemized deduction) increases the amount of federal itemized deductions, it is included here as an independent variable, and is predicted to be positively correlated with HMI deduction benefit.

SIT with HMI Deduction

In addition to the incentive to increase HMI deduction provided by the existence of SIT, to the extent that the SIT allows a deduction for HMI, the incentive and predicted federal tax deduction benefit are predicted to increase. This effect is predicted to increase with higher marginal tax rates, thus the interaction of the SIT with HMI Deduction variable with the value of the Highest State Marginal Rate.

The impact of state income tax on federal HMI deduction benefit is twofold. To the extent that state income tax systems also have a HMI deduction, residents of those states have additional incentive to mortgage, thus are expected to experience greater benefit from the federal provision. Second, because state income tax paid is an itemized deduction for federal purposes, for those households where itemized deductions excluding state income tax and HMI (i.e., deductible medical expenses, property and certain other taxes, investment interest to the extent of investment income, gifts to charity, personal casualty and theft losses, job expenses and miscellaneous itemized deductions) are less than the standard deduction, the more state income tax paid the greater the amount of benefit the household receives from their HMI deduction.

Bartlett (1996), in one of the few published discussions of the HMI deduction that considers cross-state effects, takes the perspective that the states provide a laboratory:

18 states either have no income tax or do not allow mortgage interest deductions for state taxes. Eight states (Connecticut, Illinois, Indiana, Massachusetts, Michigan, New Jersey, Ohio and Pennsylvania) have income taxes and no mortgage interest deductions.

Bartlett (1996) also makes the point that if the HMI deduction for state income tax had the anticipated effect (of increasing home ownership), then states that do not allow such deductions might be expected to have lower home ownership rates than states that do. Likewise, it would be reasonable to expect a positive correlation between a state s tax rate and its home ownership rate (due to the increased value of the tax deduction). In fact, in 1993, the average home ownership rate for the 18 states with no income tax or HMI deduction was 64.8%, compared to the national average of 64%. Further, of the five states with the highest home ownership rates, West Virginia (73.3%), Michigan (72.3%) and Pennsylvania (72%) allow no HMI deduction.

On the other end of the scale, the 12 states with the highest marginal tax rates, and the District of Columbia, demonstrate an average home ownership rate of 61.8%. Of the six states with the lowest home ownership rates, four are among this group with the highest marginal tax rates. Bartlett illustrates with the following examples: California s top 1990 income tax rate is 11%--tied with Montana for the highest in the nation--yet its home ownership rate is among the lowest at 56%. New York, Hawaii and the District of Columbia also have high tax rates and home ownership rates well below average.

Among the possible explanations for the unexpected result would be the possibility that it is the states with the lowest rates of home ownership that make efforts (i.e., offer tax incentives) to increase home ownership, while those states that already enjoy higher rates of ownership realize that they have no need to offer tax incentives to further improve.

For simplicity, this study operates under the assumption that states will adjust their income tax rate so as to hold (state income tax) revenues constant. This assumption eliminates the need to account for the interaction between state and federal income tax.

With this assumption in place, the federal income tax computation proceeds with relative ease giving up at most a minor degree of accuracy (if the assumption is false), and possibly nothing (if the assumption is true).

Property Tax Payments on Home

As discussed at the beginning of this subsection and earlier in this dissertation (under Current Provision), mortgage interest payments may have significant out-of-pocket income tax consequences for the home owner. In most cases, this savings depends on the taxpayer s marginal tax bracket, the amount of other itemized deductions available, and the size of the taxpayer s standard deduction.

Tax deductibility of property taxes provides additional incentive for home ownership, and thus is used in most tenure choice models. Narwold and Sonstelie (1992) include a property tax variable, but without the predicted result. The authors explain that the problem is most likely the result of using the average tax rate for the state as a proxy for individual household amounts. The present study attempts to overcome this problem by allowing the property tax payment amount to vary by tax return/household.

In addition to the reasoning discussed above under *State income taxes*, property taxes should be positively correlated with higher HMI deduction benefit simply because of its expected correlation with income and age.[9] Upper-income as well as older householders may be more likely to have investments in real property not used for business, the, the state, local or foreign tax on which is deductible on Schedule A along

[9]This correlation may decline above some level of income and age as richer, more mature taxpayers may tend to spend less, relative to their income, on housing.

with the real property taxes paid on their homes (IRC Sec. 164 and Form 1040 Schedule A Instructions).

Zorn (1989) uses a model of household mobility-tenure in order to provide evidence of the effect of mortgage qualification requirements as a constraint to home ownership. As is commonly done, Zorn assumes that all home owners in his national sample pay the same 1.5% of home value as a rate of property tax.[10] The present model allows property tax to vary by household. In the present study, property tax payments are known at the household level through the Census database.

Local Income Tax (LIT)

One of the advantages of the PUMS data is that household PUMA data make it possible to distinguish residents of certain localities. Fortunately for this study, residents of New York City and Yonkers, NY, the two localities in the study whose residents pay a local income tax (LIT), are identifiable. The amount of actual LIT paid is approximated as fifty percent of SIT (New York State Department of Taxation and Finance, 1989). Since the presence of LIT (a Federal itemized deduction) increases the amount of federal itemized deductions, it is predicted to be positively correlated with HMI deduction benefit.

4.2.2.3.5 Factor Analysis of State Characteristics

Factor analysis is a data reduction method that allows the common variation of a group of variables to be represented by a smaller set of factor scores. Factor analysis

[10]The households in Zorn s sample are all in metropolitan areas, so the assumption of constant property tax is not unreasonable. All things equal, tax rates in urban areas should be lower as fewer services are expected.

using a principal component extraction method is appropriate in the present study for several reasons. First, the number of variables in the state characteristic group (thirty one, as shown in Table 23) is quite large. By factor analyzing these thirty one variables, the common variation of the group can be captured with far fewer variables in the model.

Second, due to the high degree of multicollinearity among the state characteristics (as shown, again, in Table 23), factor analysis allows the common variation to be represented in factor scores, more efficiently than with the use of actual raw variables. Third, in the present study, the focus is not on the effects of individual state characteristics, but rather on the effect of the group as a whole. One drawback to factor analysis is the loss of the ability to examine the individual effects of the actual variables. This drawback, however, does not represent a serious impediment for this study. The number of factor scores that could be included in the model was constrained by the high degree of multicollinearity between the factor scores and the state dummy variables. The OLS and Tobit models allowed the inclusion of only the first five factor scores capturing about 81% of the cumulative variation (unrotated[11]) of the group of thirty one actual characteristics (as shown in Table 24.). The Ridge adjustment allowed for the entry of two additional factor scores for a total of seven (as shown in Tables 24 and 25). The scree plot shown in Figure 2 indicates that by the addition of the fifth component, significant leveling of the plot line has taken place. This, along with the decision to accept 81% as the amount of common variation in the set, provides the justification for the decision to proceed with five factor scores in the model.

[11]A varimax rotation method is also used and results are also listed in Table 24.

Table 25. shows the correlations between individual state characteristics and the first seven factor scores (of which, the first five are used in the fully partialled model reported in this study). Finally, Table 26. provides basic descriptive statistics for the first seven factor scores.

Table 25. shows how each of the 31 state characteristics correlates with each of the first seven factors (with each factor score represented by a column in the table). For example, from the bolded correlation coefficients in the first column (corresponding to the first factor score), the rate of white residents in the state (WHPOP) shows a high level of inverse correlation with the first factor (with a correlation coefficient of -0.966).

4.2.2.4 State Dummies

In order to test for the presence of residual state-to-state differences after removing the effect of all the variables in the model, a set of state dummies is introduced as the final level in the hierarchical model. Significance of this set of state dummies is an indication of the existence of other characteristics such as socio-political or cultural influences that are not reflected in the model as described.

4.3 Model Specification

The model hierarchies used in this analysis, added in causal order, are as follows:

HMIB = F(Personal Characteristics)
HMIB = F(Personal Characteristics + State Characteristics)
HMIB = F(Personal Characteristics+ State Characteristics + State Dummies)

where the dependent variable is the home mortgage interest benefit (HMIB) as a dollar amount. All independent variables (including the variables reduced by factor analysis) along with their source and variable name are shown in Table 20.

4.4 Regression Procedure

As the model specification indicates, a regression procedure is used to test the significance of three sets of causal variables. Normally, in this sort of analysis, an OLS model would be the first choice. In this case, however, the nature of the data indicates the use of other regression techniques. First, (as with the IMF based model) the censored nature of the dependent variable indicates the use of a Tobit regression. Second, due to the high degree of multicollinearity in the right hand side variables, and the resulting impact on the regression coefficients, a Ridge regression is used.

4.4.1 Ridge Regression

Ridge Regression is a technique for analyzing multiple regression data that suffer from multicollinearity.[12] When multicollinearity occurs, least squares estimates are unbiased, but their variances are large so they may be far from the true value. Variance inflation factors (VIFs) indicate a high degree of multicollinearity between the state factor scores and the state dummy variables in the fully partialled model being considered. Tables 30 provides a side-by-side comparison of OLS, Tobit and Ridge state dummy coefficients. This comparison helps to illustrate the improvement in coefficient magnitude reasonableness with the Ridge adjustment. By adding a degree of bias to the regression estimates, Ridge regression reduces the standard errors. It is hoped that the net effect will be to give more reliable estimates (Hintze 1995; SPSS 1999; SAS 1980; and Mendenhall and Sincich 1989). A key decision in applying the Ridge technique is

[12]The most severe multicollinearity in this model exists among the state characteristic variables (as discussed in the principle components analysis discussion of this dissertation), and between the state characteristics and the state dummies.

choosing the degree of bias or k. In selecting the optimal level of k, a number of factors are considered. The remainder of this section discusses the choice of a k value for this study

First, in the presence of multicollinearity, as k increases, the change in magnitude of the regression coefficients tends to decrease (i.e., they stabilize). One objective in applying a Ridge adjustment is to alleviate the problem of unstable regression coefficients. As the Ridge Trace[13] graph for the state dummy coefficients (shown in Figure 1) indicates, the k value of .19 selected for the present analysis lies in an area where coefficients on the highly collinear regressors have largely stabilized (as evidenced by the flattening-out of the trace plot).

Also, as k increases, the magnitude (i.e., absolute values) of the regression coefficients tend to decrease. This requires a Bayesian approach to the research (i.e., that there be some preexisting expectation as to what constitutes a reasonable result). In the present study, state dummy coefficient magnitudes were compared with the states respective averages for the dependent variable. This approach offers at least a reasonable range for the fully partialled state effects.

Secondly, (although not reported in this dissertation) regression coefficient variance inflation factors (VIFs) tend to decrease as k increases. In the present study,

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[13]Often, standardized coefficients are used for this purpose in place of the actual coefficient values. The trace graph provided here plots the change in actual coefficient values across a range of k values. Also, conventionally, the opening coefficient values used in ridges plot are the OLS estimates. In this case, due to the magnitude of the OLS estimates, including the OLS coefficients would have caused the scale to loose the smooth curve effect captured in the plot provided.

VIFs were examined for each of the regression coefficients. Normally, k is increased until VIFs reach some acceptable level. Although the selection acceptable/desired VIF levels is somewhat arbitrary, the smaller the VIF the less multicollinearity is affecting the regression. The final k value of .19 for this study resulted in a maximum VIF of about 1 (as compared with VIFs in the thousands in the unadjusted OLS and Tobit models).

Finally, as k increases, R^2 decreases. The mathematically optimal k considers the reduction in R^2 that is traded off for increased stability. In the present study, the regression R^2 drops from .626 in the fully partialled (five factor score) OLS model (see Table 28.b.4) to .557 with the Ridge adjustment (see Table 28.a.4.A).[14]

4.4.2 Tobit Regression

Although the censored nature of the dependent variable (home mortgage interest deduction benefit) calls for a Tobit regression, the severity of the effect on regression results of multicollinearity existing in the model at hand supercedes the need to correct for abnormality in the distribution of the dependent variable. As a result, the advantages of the Tobit model are traded for those of Ridge.

4.4.3 OLS (Ordinary Least Squares) Regression

OLS regression results are reported here primarily for comparison and verification purposes. Although the reader may wish to compare OLS results with those of Ridge and Tobit procedures, it is important to keep in mind that OLS regression coefficients are

[14]At the present time, statistical application packages such as SAS, SPSS and NCSS provide for a Ridge adjustment to an OLS regression, future research might look into the implementation of a Ridge adjustment concurrent with other non-OLS methods such as Tobit, logit, etc.

unstable in this part of the study and caution should be exercised in any attempted interpretation of these coefficients.

4.5 Hypotheses

The hypotheses tested in this part of the study are a logical extension of the investigation done in Chapter III of this dissertation Methodology - IMF Analysis. In Chapter III, the state-to-state differences in the HMI deduction tax benefit were explored preliminarily using the 1992 Statistics of Income, Individual Model File. Recall that Chapter III examines the hypothesis that, controlling only for the effect of income, there was no significant effect of state of residence on HMI deduction tax benefit using a model which was not fully partialled. This part of the study begins to examine the effects of some of the variables that are theoretically linked to the HMI deduction tax benefit, and tests up to a model which is approximately fully partialled. All hypotheses below are stated in their research form.

As each set of variables in the causal hierarchy enters the regression model, a partial Chi Squared (^{2}) statistic (similar to a partial *F*-statistic which might be used in an OLS regression analysis) tests the significance of the incremental effect of the set on the dependent variable. In other words, the statistical significance of the incremental variation in the dependent variable attributable to the entering set is tested using the Chi Squared statistic.

4.5.1 Tests of Significance for Hierarchical Sets

The significance of each set is tested as it enters the model. The first set of variables is referred to as Personal Characteristics because they describe the individual taxpayer and include the most immutable or fundamental characteristics of the household head hypothesized to impact HMI deduction benefit. As discussed previously (under Description of Data), this set includes the age, sex, and race of the household head. Also included in the set of personal variables are variables which, although personal in nature, are somewhat controllable by the household head and include income, education, occupation, marital status, and number of dependents (also discussed previously).

> H4: Personal characteristics of the taxpayer have a significant effect on the HMI deduction tax benefit.

Next to enter the equation in causal hierarchy order is the set of State Characteristics which have a theoretical link to the HMI deduction benefit enjoyed by the household. This set consists of Demographic, Housing, State Tax and Legal attributes of the state of residence.

> H5: Characteristics of the taxpayer s state of residence have significant incremental effect on the HMI deduction tax benefit beyond that explained by personal characteristics of the taxpayer.

Finally, the set of state dummy variables is introduced to test for any residual state-specific effects yet unaccounted for in the model. To the extent that this set is significant after partialling out the effects of all other characteristics considered in the model, this residual variation is hypothesized to be evidence of an interstate transfer resulting largely from the state s fair housing environment (HUD 1979; Metcalf 1988; Bureau of National Affairs 1988; Turner, *et al*. 1991; Yinger 1999).

In terms of expectation, Jones (1986) finds no significance for regional geographic indicators in explaining mortgage choice in several studies. The conclusion from this result is not that federalism is not important, or that no interstate competition exists, rather that if it exists, it is does so along lines already represented in the model.

> H6: Taxpayer s state of residence has a significant incremental/residual effect on HMI deduction tax benefit beyond that explained by personal characteristics of the household head and the characteristics of the state of residence included in the model.

Provided H6 indicates significant state effects, it is logical to consider how the eight states in the present model compare with one another. The following section describes such a comparison.

4.5.2 Winner Versus Loser States

Assuming, once again, that H6 indicates significant state socio-political effects, H7 addresses the question of which states are the winners and which are losers with respect to the distribution of the federal HMI deduction tax benefit.

> H7: Holding other personal and state effects constant, there is a significant difference in the mean residual HMI deduction benefit, as a dollar amount per household between the reference group (Colorado) and any other state.

H7 is tested straightforwardly using the t-values on state dummy variable coefficients in the fully partialled model.[15] In this case (as in the earlier part of this dissertation),

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[15]Alternatively, as in the first part of this study (involving the analysis of the 1992 IMF), a similar test could be performed by estimating a multiple regression on a standardized dependent variable with the following model (from H5):

HMIBENESTD = F(State Dummies)

In this case the coefficients on the individual state dummy variables allow for a test of the significance of variation of the HMI deduction benefit with a single reference group (the median or average state) explained by the condition of residence in that particular state without partialling out the effects of other possible causal factors.

Colorado (in being consistent with the IMF analysis) is used as the reference group. A statistically significant t-value would indicate that the state in question differs significantly from Colorado[16] in terms of the fully partialled effect.

The economic theory set forth in this dissertation as the basis for the sets of personal and state variables in this model addresses the expected HMI deduction benefit based on those factors, without considering any other sociopolitical/legal/regulatory factors which might vary by state. After controlling for personal and state characteristics, H7 tests for any residual differences between states. Significance of a state dummy coefficient here indicates that a state s residents ability to benefit from the HMI deduction for federal income tax is impacted by sociopolitical/legal/regulatory factors. Specifically, the state s fair housing environment is considered to be a proxy for such factors, and thus, a primary source of this residual variation. The following paragraphs discuss the expected outcomes for each of the eight states in the model based on the state s fair housing environment.

California is expected to be a net winner as a result of high personal incomes, high home prices, and a high state income tax. Although none of the state s localities have been recognized by the Secretary for Fair Housing, based on state and federal activity, California, along with New York, appears to have a highly successful fair housing program in place. This, along with the state s status as substantially equivalent to Title VIII, should strengthen the prediction that California would emerge a relative winner in

[16]Recall that Colorado was chosen as the reference group because of its position as the median value state in terms of HMI deduction benefit.

terms of HMI deduction benefit distribution.

Colorado is selected as the reference group for its position nearest the national average in terms of the unpartialled HMI deduction benefit (the state is also generally average demographically, although more similar to western states than eastern). Although (like California) Colorado has no localities recognized as substantially equivalent, the state itself was among the earliest to be recognized as substantially equivalent to Title VIII.

Florida s high home prices should increase relative HMI deduction benefit, however, average age of residents (assuming resident age indicates lack of need to mortgage), as well as absence of a state income tax, should work in the opposite direction. In terms of fair housing, Florida, has been substantially equivalent to Title VIII since 1984 (late relative to Colorado, Kentucky and New York which gained recognized status in 1974), and has the highest number of localities with recognized status of any state in the nation. It is interesting to note that according to the 1979 HUD study, Ft. Lauderdale-Hollywood (along with Dallas, Texas) ranks as one of the worst metro areas in this sample in terms of housing discrimination against blacks. Ft. Lauderdale-Hollywood is also not recognized as substantially equivalent (in terms of its laws).

Kentucky with its relatively low incomes and home prices should be at a relative disadvantage, offset possibly by its state income tax. On the other hand, the state s fair housing policies (Metcalf 1988) are among the most aggressive in the nation, and should tend to promote home ownership (although, whether Kentucky s legal environment promotes home ownership in the price range where HMI results in a deduction is uncertain). Further, Kentucky was among the earliest group to gain recognition as substantially equivalent to Title VIII.

Economic theory predicts that Iowa, with its low home prices should be at a disadvantage, however its state income tax could offset this effect. In terms of fair housing, although Iowa was a relatively late (1984) recipient of HUD substantially equivalent status, most of the state s major metropolitan areas (Des Moines, Dubuque and Iowa City) are recognized by the Secretary. Also, because of the relatively low rate of Iowa minority residents, fair housing is not expected to play as important a role as in other states (assuming parity with other states in terms of other forms of housing discrimination such as gender based and discrimination against children).

Illinois, with a relatively high level of discrimination (when compared with the other states in this study, as reported in HUD 1979), as well as a high level of recent fair housing activity (indicating possible problems in the area of racial and sexual discrimination, e.g. 1/13/1997 National Fair Housing Advocate Press release), should be at a relative disadvantage. This effect may be offset by the effect of relatively aggressive fair housing policy in the state including substantially equivalent status since 1980.

New York, with high incomes, high state income tax and even local income tax should be at a relative advantage, however this advantage could easily be offset by a low rate of home ownership. In this sample of states, New York also has one of the most active and effective fair housing programs including substantially equivalent status since 1972. Further, Albany-Schenectady-Troy, according to the 1979 HUD study, is one of the best metro areas in this sample in terms of equal housing treatment of blacks. Except for the fact that New York City and Rockland County are the only recognized localities in the state, all these factors (except the low rate of home ownership) would lead to the prediction that New York should be a relative winner in the HMI deduction tax benefit.

Finally, Texas, with no state income tax and its unique (recently repealed) homestead laws limiting the ability of its residents to take advantage of second mortgages (Harris 1985) should be on the losing end of the HMI deduction redistribution. In terms of fair housing policy, Texas is the only state in the study (and only one of five nationally) that has not been recognized by the Assistant Secretary for Fair Housing And Equal Opportunity as being substantially equivalent to Title VIII. Additionally, the 1979 HUD study shows Dallas to be one of the worst metro areas in this sample in terms of housing discrimination against blacks.[17]

Regardless of the statistical significance, however, it is meaningful to consider the question of economic significance: Is the dollar amount of the difference important in an economic sense? Finally, at this point the difference between the mean state effects and the fully partialled state effects can be examined.

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[17]It is interesting to note that Ft. Worth, the only recognized Texas locality, ranks well in terms of the 1979 HUD discrimination measure, while Dallas, with no state or local recognition of its fair housing laws, ranks low. The situation described here could be taken as anecdotal evidence that fair housing substantially equivalent status is correlated with lower levels of housing discrimination against blacks.

CHAPTER V

RESULTS

5.1 H1-H3 Results

This subchapter reports the results of testing each of the three hypotheses laid out in subchapter 3.6 of this dissertation. In all cases, a Tobit regression is estimated (with H3 requiring both a restricted and an unrestricted model) using Limdep, Version 7.0 by Greene (1995).[1] Tables 2 and 3 provide standard regression reports. In testing H1-H3, in all cases, the test statistic is two times the increment in the regression log likelihood (or the difference in the log likelihood) for the variable or set of variables introduced on the right hand side. This test statistic is distributed as a ^{2} with degrees of freedom equal to the number of variables added to the model (Steinberg and Colla 1991).

For H1a the increment is from Model 1 to Model 2 (i.e., adding income to the right hand side of the regression equation as shown in Table 4.a.1) results in a ^{2} of 30,259.4. With one degree of freedom, this test statistic has a P value of 0.00000 (as shown in Table 4.a.4). This indicates a strong relationship between income and HMI

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[1]Limdep also estimates an OLS regression along with the Tobit result. In testing H1-H3 in both the a and b versions, OLS results agreed with the Tobit results reported here. While Tobit results are reported in Tables 4.a and discussed below, Tables 4.b report the OLS counterpart results which are not discussed further.

benefit as a dollar amount as predicted.[2] Similarly, H1b (testing the incremental effect of income on HMI benefit as a percent of total tax) resulted in a ^{2} of 7,342.0 (as shown in Table 4.a.1) which, although noticeably smaller than its version a counterpart, is still highly significant (as shown in Table 4.a.4). These results are as expected including the prediction that the b form might show a weaker relationship than the a form since the effect of the progressive rate structure is controlled for in b but not in a.

For H2a, the increment is from Model 1 to Model 3 (adding the state of residence on the right hand side of the regression equation as shown in Table 4.a.2). This change yields a ^{2} of 10,835.2 which, with fifty one degrees of freedom has a P value of 0.00000 (as shown in Table 4.a.4). This indicates a strong relationship between income and HMI benefit, once again, as predicted. As with H1, the b version of H2 produces a somewhat smaller, but still highly significant test statistic. This result indicates that HMI deduction benefit varies significantly from state to state, even when controlling for the effect of the progressive rate structure.

Finally, H3 tests the incremental effect of moving from Model 2 to Model 4 (testing the incremental effect of state of residence after that of income has already been partialled as shown in Table 4.a.3) yielding ^{2} statistics of 2,067.6 and 784.8 for the a and b versions of the test respectively. With fifty one degrees of freedom both test statistics are significant at a P value of 0.00000. This indicates that even after partialling out the expected effect on HMI deduction tax benefit of differences in income, a strong

[2]All models were also rerun with a sample size of 2,000 with no significant change in the final outcome.

relationship between state of residence and HMI benefit still remains. This is true, as with H1 and H2, for both the a and b versions of the test, with the a version, or the dependent

variable measured in dollars of tax benefit rather than as a percent of total tax, showing a stronger relationship.

This relationship and its causal factors will be explored further in H4-H7 using an analysis based on Census data. Before concluding discussion of the H1-H3, it is informative to examine these results on a limited basis by state. Table 6 lists all 51 state dummies included in Models 3 and 4 sorted by coefficient with the respective *P*-value for each state dummy variable.[3] States in Table 6 are grouped into winner and loser by the sign of their coefficient (a state with a positive sign on its dummy coefficient is a winner and visa versa for loser). In the context of the HMI deduction interstate transfer, a winner state is defined as one whose citizens are beneficiaries of transfer at the expense of loser state residents. The reader is cautioned that the purpose of the Census based analysis in H4-H7 is to provide a basis for interpreting these results on a fully partialled, state-by-state basis. The present discussion of state-to-state differences is provided merely as a basis for discussion.

5.2 H4-H6 Results

This subchapter reports part of the results of hypothesis testing of the Census

[3]Recall that the 51 dummies represent the 50 United States, plus D.C. and OTHERST (the dummy variable representing the group of all U.S., non-state possessions), minus Colorado (the reference group).

based analysis. For H4-H6, Ridge regression results (confirmed by both Tobit and OLS[4]) are reported. These three hypotheses (regarding the significance of hierarchical sets of causal factors) use a partial *F*-ratio for testing Ridge and OLS estimated results. For Tobit regression, as in H1-H3, the test statistic is two times the increment in the regression log likelihood (or the difference in the log likelihood) for the variable or set of variables introduced on the right hand side. This Tobit test statistic is distributed as a ^{2} with degrees of freedom equal to the number of variables added to the model (Steinberg and Colla 1991). Tables 29 provides a standard regression results report for each level of the causal hierarchy model including all three regression methods (Ridge, Tobit, and OLS), while Tables 30 provide the results and a summary of the test results for H4-H6.

In H4, the significance of the effect on HMI deduction benefit of the defined set personal characteristics is tested. Recall that these characteristics describe the head of each household (assumed to be the taxpaying unit for purposes of this study), and include age, sex, race, marital status, number of dependents, educational attainment, and occupation. As Table 29 shows, H4 yields an *F* statistic of 2,293 that is highly significant. This result confirms the predictions of the housing, tenure, and mortgage choice literatures outlined in Chapter II of this study.

H5 examines the incremental effect of certain attributes of the taxpayer s state of residence (again, as suggested by the literature outlined in Chapter II, and as detailed earlier in this Chapter IV). As Table 29 shows, the Ridge regression yields an *F*-statistic

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[4]Both the Tobit and OLS results (reported in Tables 22e-l) are estimated using Limdep, Version 7.0 (Greene 1995).

of 128 that is significant at the 0.0000 level. Essentially, factor scores capturing about 81% of the variation of state characteristics include personal and financial demographics, mortgage market, and state and local tax characteristics of the taxpayer s state of residence. Although this set, by itself, is significant, the incremental significance of the set is noteworthy.

There are at least two alternative interpretations of the H4 and H5 results. First, it could be concluded that the set of personal characteristics was inadequate to fully explain the variation in the HMI deduction benefit. As a result, sufficient variation in the dependent variable remained after partialling out the effect of the initial set of personal characteristics to allow the set of state characteristics to be significant. Alternatively, this result could be interpreted as indicating that certain characteristics of the state of residence included in the set possess explanatory power with respect to the taxpayer s benefit from HMI deduction beyond that of individual taxpayer characteristics alone. Regardless of the interpretation of H5, an important purpose for setting up the analysis as modeled is to lay the foundation for testing H6.[5]

H6 examines the incremental effect of the taxpayer s state of residence on HMI deduction benefit after partialling out the described sets of personal and state characteristics. Here, the set of state dummy variables proxy for a sociopolitical/legal and regulatory environment that is hypothesized to influence HMI deduction benefit.

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[5]More detailed analysis of the effects of individual characteristics, although potentially informative, is left for future research. Before such an analysis could be done in a meaningful way, the multicollinearity problem must be addressed further. For purposes of the present study, it is sufficient to consider the significance of sets of variables.

Although small relative to the *F*-values produced in H4 and H5, the H6 *F*-value of 30 is significant at the 0.0001 level. The significance of H6 result can be interpreted in one of at least two possible ways. First, assuming the model is correctly specified, one can conclude that there are socio-political (or perhaps religious or philosophical) differences between residents of the states included which are independent of the factors modeled. Alternatively, one could argue that the model is incorrectly specified. This misspecification might be the result of several things. First, there may be omitted variables in either the personal or state characteristic sets. Alternatively, recall that the set of state characteristics were reduced down into their principle components and that only the first five factor scores were used in the model capturing approximately 81% (unrotated) of the variation of the group. Arguably, the other 19% represents misspecification. Table 25 shows the six state characteristics loading most heavily on the sixth and seventh scores that were dropped from the model. A convincing argument can be made that the direct effect of these six variables, LOCIT (approximate local income tax paid discussed above in subsection 4.2.2.3.4), ASITW (average state income tax paid for the cohort group), DISCRIM (an approximate measure of housing discrimination discussed above in subsection 4.2.2.3.2 Housing Market and Economic), PROPVAL (self reported property value for owner occupied households provided from 1990 Census), PTAX (self reported property tax for owner occupied households from 1990 Census), and MORTG2 a 0/1 dummy representing absence/presence of second mortgage respectively tax for owner occupied households from 1990 Census) is essentially omitted from the model. This being the case, it can be logically concluded that, to the extent the model would be correctly specified with the six variables included, the state dummy variables are actually capturing the variation of these six omitted state characteristics.

5.3 H7 Results

For H7, t-values for the state dummy variable coefficients in the fully partialled model provide the basis for testing the significance of the fully partialled difference in HMI deduction benefit between Colorado (the reference group) and any of the other seven states modeled (California, Florida, Illinois, Iowa, Kentucky, New York, and Texas). H7 uses Ridge (as with H4-H6) coefficient *P*-values to draw conclusions regarding relative benefit of states. In actually testing H7, Table 30 shows the state dummy coefficients and *P*-values in ascending order according to their Ridge regression coefficient values. The Ridge column of Table 30 Shows the significance of each state v. Colorado. The signs on the state dummy coefficients show that controlling for personal and other state characteristics, home owners in Iowa, Kentucky, and Texas benefit less from the HMI deduction than their counterparts in Colorado. Iowans are the largest losers v. Coloradans with Coloradans benefitting a bit over $103 more per household/return holding other effects constant. As the *P*-values in Table 30 indicate, holding all factors in the model constant, the benefit derived from the HMI deduction for Florida, New York, and Illinois residents does not differ significantly from residents of Colorado. Finally, California residents benefit more than their Colorado counterparts by an average of almost $203 per household/return holding other factors constant.

For each state in the model, Table 31 shows the mean uncorrected or main effect (i.e., tax benefit, taken from Table 15, Descriptive Statistics) ranked from lowest to highest mean effect. Corresponding mean corrected or fully partialled effects for each state in the model are also presented in Table 31 for comparison purposes. Differences between uncorrected and corrected effects (representing the effects captured for each state by the rest of the model) are reported at the far right of the table. As with the actual hypothesis testing, the corrected effect values are produced using the Ridge regression results. Finally, Table 31 shows the difference in each mean effect between a given state, and the next closest state ranked by uncorrected effect.

Further light can be shed on the winner v. loser question. Given that the hypothesis of systematic socio-political differences between states cannot be rejected, Table 31 shows the mean of this fully partialled effect for each state in the present model.[6] For each state in the table, this mean represents the average effect of state of residence on the dependent variable after removing all other effects represented in the model. For example, holding constant all effects represented in the model, residing in Colorado has an average effect on home mortgage interest deduction benefit of approximately $366 per tax return versus residents of the other seven states in the model.

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[6] This mean effect is computed as the sum of model variable coefficient multiplied by the respective variable mean with all state dummy means of zero, except for the indicated state with a value of one.

CHAPTER VI

CONCLUSIONS, CONTRIBUTIONS, FUTURE RESEARCH & LIMITATIONS

6.1 Conclusions

The primary conclusion to be drawn from this study is that there is a significant amount of variation between residents of different states in the HMI deduction benefit realized in 1992. This variation persists even after removing the effect of income on the HMI tax benefit. This conclusion is the basis for the second part of the study investigating state characteristics which could explain the state-to-state differences. This part of the analysis reveals that even after partialling out the effects of personal characteristics of the head of household, a set of state characteristics possesses significant explanatory power in terms of household HMI deduction tax benefit. Finally, after factoring out both personal as well as the defined set of state characteristics, there still remains a significant difference in HMI deduction benefit between states. This difference is hypothesized to be attributable to socio-political differences between states which are not captured in the present model. Future research should attempt to narrow down the state-to-state differences causing this residual, unexplained variation in HMI deduction tax benefit.

6.2 Contributions

This study extends existing research in the following areas: (1) distributional analysis of the effects of Federal Income Taxation, (2) fiscal federalism and competition between states, and (3) determinants of mortgage borrowing choice, with implications for housing and tenure choice. Further, this study attempts to bridge the gap between these areas.

To the extent that other nations are formed by the unification of heterogeneous states, the issue of federalism is important. To the extent that fiscal federalism exists as a policy objective in the United States, this study may have important implications for domestic income tax policy. For other jurisdictions, the less cohesive the political union (i.e., the less people feel they belong to the same group), the more important the distributional consequences of federal tax policies such as the HMI deduction are likely to be. In other words, the less people feel they will benefit from being part of a particular group (for example, the United States), the less willing they are to share with other members of the group. In such a case it is natural that concern will increase whenever there is a perception that resources are being involuntarily appropriated and transferred to an outside group (for example, the citizens of another state).

At a minimum, this study offers a rare national analysis of state-to-state differences in a major tax provision. The study also allows for variation across households and states of certain potentially significant causal variables. These variables include a set of personal characteristics of the head of household as well as a set of characteristics of the state. The concepts and techniques applied in this study could easily be applied to other provisions of federal tax, as well as to the possibly differential effects of state tax provisions on residents of various localities within the state. Finally, the methodology employed in this study may be transferred to the exploration of tax settings of other federations. It is hoped that by

highlighting this federalist aspect of the HMI deduction benefit distribution, this work sheds new light on the consequences of this tax provision as well as others.

6.3 Future Research

1. The quality of the dependent variable used in the fully partialled model can be improved by employing a tax simulator such as TAXSIM to create a tax benefit value taking into account more of the characteristics of the household (provided in the PUMS combined housing and persons record).
2. The second part of the study could be expanded to include all U.S. states D.C. and other possessions as in the first part of the study.
3. Although not necessarily a direct extension of the present study alone, a validation procedure of the TAXSIM simulator would be an important contribution to the tax literature. Feenberg suggests regressing the error term from this regression ( ) on the known flaws in TAXSIM to test each for significance. For purposes of the present study, is on the HMI deduction benefit. This regression is modeled as follows:

   $$= \quad + \quad {}_1\text{*(HMI benefit)} + \quad .$$

   The significance of $_1$ provides the test of interest.
4. This study could be expanded to include other forms of home ownership subsidy such as the federal income tax provisions for the deduction of real property taxes,

gain deferral provisions (Sec. 1034), one time gain exclusion (Sec. 121[1]), capital gain preference (Sec. 1(h)); state income tax provisions that mirror federal; and non-tax government subsidies such as HUD.

5. Future study is possible using the mortgage interest deduction along with other IMF tax return data (such as income) along with statistics on investment/wealth by income class, or even better, by state of residence and by income to predict speculative real estate investment behavior based on the non-residence real property tax deduction.

6. A possible extension of this study would be to actually simulate (on a static basis) the effect of indexing (based on housing cost in each state) on the distribution of the HMI deduction.

7. A panel data analysis would be helpful in revealing the changes in the observed relationships across time. In particular, the effect of such changes as a change in taxpayer income or changes in tax policy could be studied.

8. The HMI deduction is but one feature of the U.S. Federal Income Tax. This analysis could be replicated on other individual features of the federal revenue system including the system as a whole. The deduction for HMI is the largest tax deduction for personal income tax. Each deduction, having its own rationale, is subject to scrutiny for reduction/elimination purposes as the federal government

[1] During the time of this study, the Section 121 exclusion amount was $125,000 per return (half that amount for married filing separately). Currently (for sales and exchange after 5/6/97), the exclusion is $250,000 per return and $500,000 for a married couple filing jointly (RIA, 2000).

attempts to reduce spending.

9. Continuing in the vein of number eight (above), further comparison could be performed by repeating the analysis using estimated household tax characteristics based on survey information rather than the actual tax return data themselves. This is the predominant technique in the economics literature.

10. Future research might examine lobbying and voting on the HMI deduction and related issues (particularly in the mid-1980s surrounding the 1986 and 1987 Tax Acts) to seek evidence of a federalist motive.

11. Due to the gross nature of the state specific measurements used in this study, additional insight might be gained by limiting the scope of examination to, for example, two states. More detailed demographic data could be combined with survey data to allow a more refined analysis. More detailed analysis could be conducted on a limited number of states. For example, California might be compared with Texas. Such a study might focus on the effect of a change (over time) on the relative benefit from the HMI deduction between residents of states where interdependencies are believed to exist.

12. The use of survey data in the present study is limited to aggregate statistical data. Future research might benefit from the collection and use of survey data in order to obtain a closer approximation of the actual causal relationships being proxied here.

13. This study should be replicated in the context of federal tax systems of other nations.

14. This study should be followed up with a search for evidence of support or lack thereof for the HMI deduction on the part of state representatives.

15. As mentioned in the Data section of this dissertation, a drawback to the use of Census of Population and Housing data in the method proposed here is that, unlike some other Census data that comes pre-aggregated, the Population and Housing data are household level. This requires that aggregate statistics be extracted, which is an extra step in the analysis. One benefit resulting from this, however, is that it leaves the door open for the application of alternative methodology such as a database merger technique. A comparison of these alternative techniques could, in itself, be valuable from a strictly methodological standpoint.

16. Although outside the realm of accounting/tax research, further study may be needed in the area of the joint housing/mortgage decision.

17. According to America s Community Bankers *et al.* (1995), the distribution of home equity lines of credit (HELCs) across states is extremely uneven with three percent or less in Iowa, Oklahoma, Louisiana and Arkansas, and 20 percent or more in Hawaii, Maryland, Montana, Nevada, New Hampshire, North Dakota, and Utah. All things being equal, failure to model this disparity in the present study biases against finding significant results (i.e., differences between states). A dynamic model should be developed to explore this area as part of future research.

18. Once identified, key characteristics of each state should be analyzed to determine which are significant in determining the amount of HMI deduction necessary to

equalize federal subsidy across states. Next, these key factors could be used to compute an index that, when applied to the HMI deduction, adjusts for key factors causing differences between states. Several approaches to implementing such an equalization scheme including a cap on the deduction which might vary by state.

19. Given the close practical linkage between the flat tax and the HMI deduction, a search of congressional discussion around the 1913 tax code could prove interesting in revealing motivations for the HMI deduction in a flat tax context.

20. The techniques and data used here could be used to examine the question of potential federal tax policy affecting resource transfers between metropolitan and non-metropolitan areas.

21. Perhaps a similar analysis of the tax benefit of all itemized deductions is necessary as a basis for comparing the benefit of the HMI deduction specifically. Such analysis would be meaningful in determining whether the HMI deduction is unique, or merely reflects the pattern of benefit of itemized deductions in general.

22. A further extension of the present study is to combine this analysis with traditional tax equity analysis using techniques such as the Suites Index (Suites 1977; Ricketts 1988).

23. The issue of federalism is not specific to the United States. In fact, most nations face this issue to some extent if their government is not either unitary or confederate in form. This being the case, other nations could provide the basis for applying the methodology used here (assuming data availability). For example, Ekpo (1994) examines the issue of federalism in Nigeria.

6.4 Limitations

1. Significant limitations of this research will result from the fact that part of the tax database has been blurred for confidentiality purposes. Such limitations exist at high income levels. Also, the same database may suffer from inadequate sample size for smaller states.
2. Another major limitation of this study is model misspecification. It is highly likely that the true underlying model should be correctly specified as a simultaneous system.
3. A limitation of the chosen data is the lack of information about taxpayer wealth other than income, thus income must serve as a proxy for wealth. Unfortunately, the two are not equivalent (i.e., wealth and income are not always highly correlated). Take for instance a farmer who has a relatively large asset holding (his farm) but who may have relatively little income. On the other hand, a young professional, say doctor or lawyer, just starting out may have substantial income with relatively little wealth. In the context of this study, the difference between income and wealth could be important in determining the taxpayer s benefit from the HMI deduction. In addition to other differences in preference between the wealthy and others, the wealthy don t need to finance home consumption the way others, even those with incomes do.
4. A high degree of multicollinearity probably exists between the independent variables. This is not necessarily a problem for the present study as long as the collinear variables are treated as a set. The problem may arise in attempting to

separate the effects of taxpayer income from average state income.

5. Variables such as property tax rates are simplified (i.e., averaged). The variable actually varies by county/locality within the state and is averaged for the state. A finer analysis would be useful, but would require more detailed data.

6. Due to the confidential nature of the individual financial data, the model used in this study omits important nonfinancial characteristics of the individual and is, therefore, misspecified. Clapp (1987) suggests a fairly complete definition of key variables. Among the most important missing variables is a location variable (i.e., all residents of a given state are treated as though they lived in the same area—city or county, ghetto or suburb). Although income and other included variables may proxy for some of those missing from the model, this remains a weakness of unknown magnitude. As suggested in the Future Research subchapter of this dissertation, use of survey data offers a possible means of overcoming this shortfall.

7. This study shows anecdotal evidence of the interest on the part of higher cost of living states (e.g., New York, see comments by Gov. George Pataki and Sen. Alfonse D Amato in subchapter 2.2 Current Political Debate Surrounding HMI Deduction of this study) in the continuation of the HMI deduction. There is also evidence of the conflict between higher and lower living cost states in the words of Sen. Robert Packwood of Oregon (also in subchapter 2.2). Support of the HMI deduction may, in essence, be support for the status quo in highly developed (i.e., more expensive) regions of the country. The unanswered question is: Why

do the lower cost regions appear to mind as they will also lose the deduction? Is it that they fear the ripple effect of damage to the national status quo that might result from a shock to the major metropolitan housing markets? A full investigation of this issue is left for future research.

8. To the extent that there are multiple definitions for such key variables as *income* and various definitions of conditions such as *regressivity*, the results of analyses such as the present one are easily manipulated.

9. There is an implicit assumption that taxpayer preferences are reflected in the distribution of tax benefits. A prerequisite for taxpayer preference, however, is an awareness of the determinant issues. Although a federalist attitude or interstate competition (or lack thereof) might explain the present test results, this study does not show conclusively that any such awareness exists with respect to the HMI deduction specifically.

10. Because of the nature of the Census data used in the hierarchical model, there is increased likelihood of Type I error (failure to reject a false null hypothesis). Understanding the exploratory nature of the study, this is not viewed as a serious limitation. Regardless of the result of the present study, the door remains open for the application of other analytical techniques.

11. The inability of data to measure rental costs at the household level represents a serious limitation to the hierarchical causal model.

12. The justification for using characteristics of the head of household (primarily in testing H6) is that socially, economically and culturally the head of household is

the best measure of the household in general. An issue which is not dealt with in this dissertation is the possibility of variation within the household in terms of the variables tested which could impact the HMI deduction benefit enjoyed by the entire household. Exceptions to the assumption are inevitable, and are hoped to be insignificant, or at leased not biasing in their effect on the hypotheses tested.

13. Another assumption underlying the models used in this dissertation is that taxpayers refrain from playing games when it comes to tax reporting. This assumption could materially change the results of the present study if a group of taxpayers, for example, engaged in some tax savings tactic in the year in question in a way which biased the result. There are opportunities to study taxpayer behavior, however, the present methodology and analysis is not seen as the best possible opportunity to study taxpayer game playing, thus, the issue is not addressed.

14. Another possible weakness in this analysis is the possibility that taxpayers (who are also Census participants) will fail to understand or otherwise fail to comply with tax or Census reporting requirements. It is also possible that wording of the Census questionnaire might lead to systematic differences between tax and Census reporting. For example, wording of the Census questions regarding the amount of mortgage payments may result in systematic differences between the amount of mortgage interest estimated based on information reported to the Bureau of Census and the amounts reported to the IRS for income taxes.

15. The Census data analysis portion (described in Chapter IV) of the present study

does not recompute the state income tax deduction taken for federal income tax. When federal income tax is increased (for example through the repeal of a tax deduction), the effect would be an decrease in state income tax (resulting from an increased deduction for federal taxes on the state tax return[2]) assuming no adjustment in state tax structure to compensate for the change. To the extent there is an interaction between federal and state income tax (i.e., federal income tax is deductible for state income tax and visa versa), this would create a bias in the amount of state income tax used in the analysis to compute federal income tax. Since state tax rates tend to be relatively low, and the effect on the amount of HMI deduction benefit for federal income tax would be the product of the change in deduction times the federal rate times the state rate, the final amount should be relatively small, thus, probably not significant. If significant, the difference could certainly bias the results of H6 and H8 against finding differences in HMI deduction benefit in states with an income tax deduction for HMI.

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[2]In 1993, only Alabama, Iowa, Louisiana, Missouri, Montana, Oklahoma and Utah allow a deduction for individual income taxes for federal income taxes (ACIR 1990).

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TABLES

Table 1. HMI Benefit per Tax Return by State for the 1992 IMF

State	Mean	*N*	Std. Dev.	Med.	Min.	Max.	Variance
AL	351.158	816	994.92	0	0	8627	989864
AK	388.772	232	968.55	0	0	5509	938088
AZ	540.139	842	1145.08	0	0	10146	1311219
AR	299.39	520	1023.95	0	0	17670	1048465
CA	1365.703	8757	2856.28	0	0	51037	8158311
CO	658.441	952	1337.55	0	0	12445	1789032
CT	1085.428	859	2501.87	0	0	30507	6259346
DE	606.173	168	1189.86	0	0	7626	1415765
DC	905.063	158	1844.31	0	0	13277	3401468
FL	510.425	3303	1527.06	0	0	35912	2331902
GA	586.468	1431	1275.99	0	0	10575	1628141
HI	951.56	298	2409.12	0	0	27368	5803849
ID	418.085	270	1025.94	0	0	6977	1052561
IL	631.426	2634	1520.39	0	0	17323	2311576
IN	348.051	1151	1085.44	0	0	22469	1178176
IA	199.586	800	575.45	0	0	5337	331139
KS	324.189	604	896.52	0	0	12147	803740
KY	282.699	801	878.12	0	0	9665	771090
LA	329.136	832	984.68	0	0	10830	969591
ME	460.279	272	1500.2	0	0	16252	2250599
MD	1083.258	1197	2051.48	0	0	22339	4208553
MA	880.819	1489	1966.87	0	0	25641	3868582
MI	466.131	1939	1114.45	0	0	15069	1242002
MN	601.13	1156	1283.58	0	0	12350	1647583
MS	235.487	466	775.21	0	0	8832	600951
MO	310.69	1134	832.48	0	0	8281	693022
MT	203.075	201	663.68	0	0	6109	440475
NE	243.36	414	752.03	0	0	7408	565551
NV	679.689	360	1709.67	0	0	16905	2922955

State	Mean	*N*	Std. Dev.	Med.	Min.	Max.	Variance
NH	796.718	308	2564.74	0	0	33821	6577896
NJ	919.886	1930	1945.64	0	0	26026	3785515
NM	387.239	351	981.02	0	0	6365	962391
NY	636.314	4006	1603.56	0	0	29222	2571410
NC	491.264	1451	1228.19	0	0	10555	1508458
ND	201.673	168	550.61	0	0	3355	303175
OH	419.683	2306	1140.34	0	0	14115	1300384
OK	252.887	743	738.35	0	0	7282	545163
OR	436.219	745	869.01	0	0	6420	755185
PA	492.73	2646	1334.32	0	0	19316	1780419
RI	661.757	243	1885.05	0	0	16061	3553414
SC	450.575	744	1184.76	0	0	13222	1403656
SD	109.894	226	561.17	0	0	5327	314917
TN	299.868	1074	864.25	0	0	7548	746921
TX	407.566	4009	1346.67	0	0	22228	1813509
UT	510.716	359	1218.74	0	0	9048	1485336
VT	443.577	170	1025.68	0	0	6905	1052029
VA	949.261	1462	1833.89	0	0	15465	3363139
WA	622.222	1318	1588.45	0	0	16535	2523167
WV	257.775	316	1068.17	0	0	14328	1140979
WI	428.288	1121	1074.62	0	0	14923	1154818
WY	136.000	117	454.4	0	0	3326	206479
Other	72.596	109	349.47	0	0	2586	122131
Total	657.159	60286	1733.56	0	0	51037	3005220

Table 2. IMF Based Regression Results - Dependent Variable in Dollars ($)

Table 2.a. OLS Regression Results ($)

Table 2.a.1. OLS Regression Results ($) - Model 1

(Constant only, results not reported)

Table 2.a.2. OLS Regression Results ($) - Model 2

Dependent variable: HMIBENE				
Model size: N = 60286, Parameters = 2, Df= 60284				
Residuals: SS= .1736048880E+12, SD= 1696.99258				
Fit: R^2= .041755, Adjusted R^2 = .04174				
Model test: F[1, 60284] = 2626.87, P-value = .00000				
Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	599.2227853	7.0033194	85.563	.0000
INCOME	.2459832439E-02	.47993954E-04	51.253	.0000

Table 2.a.3. OLS Regression Results ($) - Model 3

Dependent variable: HMIBENE				
Model size: N = 60286, Parameters = 52, Df= 60234				
Residuals: SS= .1736399383E+12, SD= 1697.86814				
Fit: R^2= .041562, Adjusted R^2 = .04075				
Model test: F[51, 60234] = 51.22, P-value = .00000				
Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	560.4317460	47.832016	11.717	.0000
AL	-209.2736578	76.293455	-2.743	.0061
AK	-171.6601943	121.29953	-1.415	.1570
AZ	-20.29279116	75.575146	-.269	.7883
AR	-261.0413614	88.496688	-2.950	.0032
CA	805.2708919	51.157563	15.741	.0000
CT	524.9966591	75.125536	6.988	.0000
DE	45.74087302	139.45309	.328	.7429
DC	344.6315451	143.29408	2.405	.0162
FL	-50.00667791	56.219844	-.889	.3737
GA	26.03575921	65.592732	.397	.6914
HI	391.1286567	109.36901	3.576	.0003
ID	-142.3465608	113.86297	-1.250	.2112
IL	70.99422208	58.157908	1.221	.2222
IN	-212.3804863	69.227656	-3.068	.0022
IA	-360.8454960	76.755111	-4.701	.0000
KS	-236.2430043	84.027834	-2.811	.0049

KY	-277.7326199	76.725800	-3.620	.0003
LA	-231.2959287	75.846905	-3.050	.0023
ME	-100.1523343	113.51771	-.882	.3776
MD	522.8263993	68.528968	7.629	.0000
MA	320.3869242	64.991821	4.930	.0000
MI	-94.30126640	61.437976	-1.535	.1248
MN	40.69801176	69.149371	.589	.5562
MS	-324.9446216	92.054733	-3.530	.0004
MO	-249.7421517	69.498308	-3.593	.0003
MT	-357.3571192	128.95725	-2.771	.0056
NE	-317.0718426	96.182540	-3.297	.0010
NV	119.2571429	101.46703	1.175	.2399
NH	236.2857864	107.92358	2.189	.0286
NJ	359.4542643	61.494372	5.845	.0000
NM	-173.1924298	102.47381	-1.690	.0910
NY	75.88178368	54.840782	1.384	.1665
NC	-69.16779014	65.380726	-1.058	.2901
ND	-358.7591270	139.45309	-2.573	.0101
OH	-140.7483115	59.481198	-2.366	.0180
OK	-307.5448012	78.535272	-3.916	.0001
OR	-124.2129541	78.468931	-1.583	.1134
PA	-67.70158730	58.115220	-1.165	.2440
RI	101.3254556	118.95838	.852	.3943
SC	-109.8564772	78.502064	-1.399	.1617
SD	-450.5379407	122.65178	-3.673	.0002

TN	-260.5639620	70.512639	-3.695	.0002
TX	-152.8655200	54.835872	-2.788	.0053
UT	-49.71586859	101.57688	-.489	.6245
VT	-116.8552754	138.72740	-.842	.3996
VA	388.8295399	65.266310	5.958	.0000
WA	61.79056050	66.896352	.924	.3557
WV	-302.6564296	106.82017	-2.833	.0046
WI	-132.1436104	69.710079	-1.896	.0580
WY	-424.4317460	164.09401	-2.587	.0097
OTHERST	-487.8354158	169.51462	-2.878	.0040

Table 2.a.4. OLS Regression Results ($) - Model 4

Dependent variable: HMIBENE

Model size: N = 60286, Parameters = 53, Df= 60233

Residuals: SS= .1661061900E+12, SD= 1660.64064

Fit: R^2= .083146, Adjusted R^2 = .08235

Model test: F[52, 60233] = 105.04, P-value = .00000

Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	500.5087442	46.797296	10.695	.0000
AL	-215.1303435	74.620727	-2.883	.0039
AK	-166.2094331	118.63996	-1.401	.1612
AZ	30.13456182	73.924380	.408	.6835
AR	-259.1445042	86.556314	-2.994	.0028
CA	815.6197478	50.036273	16.301	.0000
CT	538.4441728	73.478782	7.328	.0000
DE	19.86647208	136.39634	.146	.8842
DC	291.0048981	140.15597	2.076	.0379
FL	-16.96461856	54.990800	-.308	.7577
GA	14.23808925	64.154941	.222	.8244
HI	373.8652482	106.97149	3.495	.0005
ID	-122.5448349	111.36705	-1.100	.2712
IL	49.56755788	56.884213	.871	.3835
IN	-227.5503314	67.710391	-3.361	.0008
IA	-360.8612186	75.072176	-4.807	.0000
KS	-219.2158272	82.186084	-2.667	.0076

KY	-256.9798744	75.044558	-3.424	.0006
LA	-187.1756666	74.188686	-2.523	.0116
ME	-104.1979406	111.02874	-.938	.3480
MD	501.9898069	67.027585	7.489	.0000
MA	334.4611004	63.567379	5.262	.0000
MI	-111.5859147	60.091796	-1.857	.0633
MN	25.65450888	67.633812	.379	.7045
MS	-316.0163066	90.036501	-3.510	.0004
MO	-256.3031309	67.974602	-3.771	.0002
MT	-284.4908370	126.13743	-2.255	.0241
NE	-303.6357112	94.073990	-3.228	.0012
NV	132.6462728	99.242591	1.337	.1814
NH	259.1064546	105.55815	2.455	.0141
NJ	335.8632907	60.147739	5.584	.0000
NM	-153.2275338	100.22770	-1.529	.1263
NY	58.73480361	53.639345	1.095	.2735
NC	-78.91165661	63.947458	-1.234	.2172
ND	-333.4618527	136.39630	-2.445	.0145
OH	-161.9480324	58.178425	-2.784	.0054
OK	-244.2321393	76.822856	-3.179	.0015
OR	-138.1813537	76.748885	-1.800	.0718
PA	-88.51248579	56.842379	-1.557	.1194
RI	108.6268860	116.35018	.934	.3505
SC	-125.3739526	76.781400	-1.633	.1025
SD	-464.4004277	119.96281	-3.871	.0001

TN	-257.7981108	68.966598	-3.738	.0002
TX	-108.1488672	53.640363	-2.016	.0438
UT	-28.21523884	99.350558	-.284	.7764
VT	-97.48127273	135.68616	-.718	.4725
VA	362.6469575	63.837245	5.681	.0000
WA	63.91527720	65.429594	.977	.3286
WV	-324.9005522	104.47889	-3.110	.0019
WI	-152.1490912	68.182689	-2.231	.0256
WY	-381.1033501	160.49822	-2.375	.0176
OTHERST	-495.7323673	165.79791	-2.990	.0028
INCOME	.2460083058E-02	.47067364E-04	52.267	.0000

Table 2.b. Tobit Regression Results ($)

Table 2.b.1. Tobit Regression Results ($) - Model 1

Dependent variable:	HMIBENE			
N	60286			
LL	-201963.9			
Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	-2141.658235	26.961712	-79.433	.0000

Table 2.b.2. Tobit Regression Results ($) - Model 2

Dependent variable	HMIBENE			
N	60286			
LL	-191189.3			
Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	-3940.287153	32.623331	-120.781	.0000
INCOME	.5010282137E-01	.36993050E-03	135.438	.0000

Table 2.b.3. Tobit Regression Results ($) - Model 3

Dependent variable: HMIBENE				
N 60286				
LL -200849.4				
Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	-2221.113551	134.66488	-16.494	.0000
AL	-753.3707317	220.97145	-3.409	.0007
AK	-851.3601313	361.04029	-2.358	.0184
AZ	260.4419998	207.42787	1.256	.2093
AR	-850.9083315	258.85004	-3.287	.0010
CA	1629.299622	141.44838	11.519	.0000
CT	1226.421499	201.39466	6.090	.0000
DE	274.3251196	381.27804	.719	.4718
DC	915.0562160	380.24025	2.407	.0161
FL	-277.8452401	157.95355	-1.759	.0786
GA	247.1130591	181.15365	1.364	.1725
HI	703.7818972	297.17812	2.368	.0179
ID	-402.6420126	325.19044	-1.238	.2157
IL	146.5536679	161.86603	.905	.3653
IN	-660.9546971	198.31946	-3.333	.0009
IA	-1359.063384	230.42071	-5.898	.0000
KS	-662.9717608	242.10710	-2.738	.0062
KY	-1102.987709	227.12205	-4.856	.0000
LA	-1044.632794	224.12545	-4.661	.0000
ME	-582.8907257	330.89666	-1.762	.0781

MD	1418.446183	183.34226	7.737	.0000
MA	843.2523739	177.18368	4.759	.0000
MI	-62.19902913	171.24404	-.363	.7164
MN	363.2264182	189.79414	1.914	.0556
MS	-1391.327212	281.80267	-4.937	.0000
MO	-735.6833581	199.60520	-3.686	.0002
MT	-1420.121392	400.54638	-3.545	.0004
NE	-1239.281359	291.02785	-4.258	.0000
NV	187.9957915	281.47512	.668	.5042
NH	579.4153765	292.81300	1.979	.0478
NJ	983.6665812	167.63455	5.868	.0000
NM	-669.7520228	298.51840	-2.244	.0249
NY	290.1517544	152.24677	1.906	.0567
NC	-179.0900793	183.44385	-.976	.3289
ND	-1447.460776	435.39189	-3.325	.0009
OH	-371.9392394	167.47194	-2.221	.0264
OK	-1071.128098	231.69562	-4.623	.0000
OR	179.8070536	214.95924	.836	.4029
PA	-196.0387355	162.89008	-1.204	.2288
RI	227.6562762	328.27204	.693	.4880
SC	-229.9044721	220.85450	-1.041	.2979
SD	-2980.457984	459.39928	-6.488	.0000
TN	-1187.012087	208.90281	-5.682	.0000
TX	-864.8299510	156.18454	-5.537	.0000
UT	200.4524947	278.04545	.721	.4709

VT	-100.4428425	386.70256	-.260	.7951
VA	1105.955335	176.54486	6.264	.0000
WA	92.16275826	186.35996	.495	.6209
WV	-1618.835057	338.70421	-4.779	.0000
WI	-285.8858451	196.25123	-1.457	.1452
WY	-1663.685054	523.46693	-3.178	.0015
OTHERST	-3695.193471	722.68535	-5.113	.0000

Table 2.b.4. Tobit Regression Results ($) - Model 4

Dependent variable:	HMIBENE			
N	60286			
LL	-190148.5			
Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	-3941.933806	110.22678	-35.762	.0000
AL	-365.6475867	177.22354	-2.063	.0391
AK	-709.2282004	298.47733	-2.376	.0175
AZ	456.9040374	165.14421	2.767	.0057
AR	-632.8836028	209.60425	-3.019	.0025
CA	1428.543563	112.84626	12.659	.0000
CT	757.4200823	160.24216	4.727	.0000
DE	59.23899337	300.92647	.197	.8439
DC	487.7957778	300.15011	1.625	.1041
FL	-130.9830698	126.34730	-1.037	.2999
GA	190.6023197	144.34276	1.320	.1867
HI	789.0145040	233.92598	3.373	.0007
ID	-63.54463499	260.20063	-.244	.8071
IL	22.35784197	129.23694	.173	.8627
IN	-375.3156139	158.61755	-2.366	.0180
IA	-860.5913726	185.36377	-4.643	.0000
KS	-481.6466254	194.68123	-2.474	.0134
KY	-696.2999936	183.75574	-3.789	.0002
LA	-789.2340113	182.45529	-4.326	.0000
ME	-199.9767260	264.00926	-.757	.4488

MD	989.5793631	145.06207	6.822	.0000
MA	590.2228647	141.19537	4.180	.0000
MI	-45.14058318	136.70834	-.330	.7413
MN	258.8776122	151.11175	1.713	.0867
MS	-986.3951233	229.48690	-4.298	.0000
MO	-428.1289829	159.75584	-2.680	.0074
MT	-776.5652886	326.95507	-2.375	.0175
NE	-710.3287530	233.56551	-3.041	.0024
NV	162.6795106	225.27663	.722	.4702
NH	221.3105958	233.72366	.947	.3437
NJ	558.7642812	133.24466	4.194	.0000
NM	-300.6657789	241.28942	-1.246	.2127
NY	-11.99296267	121.66259	-.099	.9215
NC	-15.00680841	146.35779	-.103	.9183
ND	-1068.990428	353.08305	-3.028	.0025
OH	-167.0916033	133.59753	-1.251	.2110
OK	-655.7955725	187.39529	-3.500	.0005
OR	100.4128286	170.64239	.588	.5562
PA	-185.8388701	130.09256	-1.429	.1531
RI	303.0695281	261.70476	1.158	.2468
SC	-37.75961552	176.88933	-.213	.8310
SD	-2194.462109	378.74477	-5.794	.0000
TN	-701.1775184	167.88947	-4.176	.0000
TX	-726.9808418	125.74691	-5.781	.0000
UT	373.1297338	219.67816	1.699	.0894

VT	293.9039890	308.27402	.953	.3404
VA	702.7778375	140.18627	5.013	.0000
WA	.8247285766	148.53915	.006	.9956
WV	-1131.569291	277.74785	-4.074	.0000
WI	-250.9878111	157.26415	-1.596	.1105
WY	-955.5362161	415.56868	-2.299	.0215
OTHERST	-2089.295559	563.47333	-3.708	.0002
INCOME	.4835378474E-01	.35655932E-03	135.612	.0000

Table 3. IMF Based Regression Results - Dependent Variable as a % (%)

Table 3.a. OLS Regression Results (%)

Table 3.a.1. OLS Regression Results (%) - Model 1

(Constant only, results not reported)

Table 3.a.2. OLS Regression Results (%) - Model 2

Dependent variable: HMIBEPCT				
Model size: N = 60286, Parameters = 2, Df= 60284				
Residuals: SS= .2544232481E+11, SD= 649.64689				
Fit: R^2= .000177, Adjusted R^2 = .00016				
Model test: F[1, 60284] = 10.69, P-value = .00108				
Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	37.30139121	2.6810280	13.913	.0000
INCOME	.6005951162E-04	.18373164E-04	3.269	.0011

Table 3.a.3. OLS Regression Results (%) - Model 3

Dependent variable: HMIBEPCT				
Model size: N = 60286, Parameters = 52, Df= 60234				
Residuals: SS= .2532559642E+11, SD= 648.42386				
Fit: R^2= .004764, Adjusted R^2 = .00392				
Model test: F[51, 60234] = 5.65, P-value = .00000				
Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	20.68326651	18.267273	1.132	.2575
AL	-16.33454418	29.136831	-.561	.5751
AK	-16.53169328	46.324862	-.357	.7212
AZ	-10.53115753	28.862505	-.365	.7152
AR	-16.01070581	33.797303	-.474	.6357
CA	116.8742149	19.537315	5.982	.0000
CT	62.60703807	28.690797	2.182	.0291
DE	-16.09143997	53.257795	-.302	.7625
DC	-9.052027627	54.724687	-.165	.8686
FL	20.68704096	21.470624	.964	.3353
GA	-3.197168565	25.050174	-.128	.8984
HI	44.38149436	41.768542	1.063	.2880
ID	-12.21421493	43.484807	-.281	.7788
IL	4.653065372	22.210780	.209	.8341
IN	-16.80782783	26.438369	-.636	.5249
IA	-20.23979268	29.313139	-.690	.4899
KS	-17.31639666	32.090627	-.540	.5895
KY	-10.43704559	29.301945	-.356	.7217

LA	-13.87071119	28.966291	-.479	.6320
ME	.3439121707	43.352949	.008	.9937
MD	28.90600969	26.171536	1.104	.2694
MA	49.60374454	24.820684	1.998	.0457
MI	-10.85186593	23.463453	-.463	.6437
MN	-8.536291649	26.408471	-.323	.7465
MS	7.335212182	35.156137	.209	.8347
MO	-15.17722455	26.541732	-.572	.5674
MT	-18.46543605	49.249383	-.375	.7077
NE	-18.18922199	36.732566	-.495	.6205
NV	-14.45223525	38.750738	-.373	.7092
NH	128.2329093	41.216526	3.111	.0019
NJ	24.90141983	23.484991	1.060	.2890
NM	16.09449573	39.135233	.411	.6809
NY	8.227404665	20.943954	.393	.6944
NC	-9.672360222	24.969208	-.387	.6985
ND	-20.65535623	53.257795	-.388	.6981
OH	-7.770708116	22.716150	-.342	.7323
OK	-18.96243861	29.992991	-.632	.5272
OR	-10.82929028	29.967656	-.361	.7178
PA	-11.26922910	22.194477	-.508	.6116
RI	-9.446117208	45.430767	-.208	.8353
SC	-15.78824768	29.980309	-.527	.5985
SD	-20.04294516	46.841296	-.428	.6687
TN	-6.935658336	26.929110	-.258	.7968

TX	-3.481586486	20.942079	-.166	.8680
UT	-13.20032561	38.792692	-.340	.7336
VT	4.185186494	52.980649	.079	.9370
VA	8.968284488	24.925512	.360	.7190
WA	-5.488278032	25.548033	-.215	.8299
WV	-19.87403730	40.795126	-.487	.6261
WI	-8.668470818	26.622609	-.326	.7447
WY	-20.63901796	62.668277	-.329	.7419
OTHERST	-12.01513924	64.738434	-.186	.8528

Table 3.a.4. OLS Regression Results (%) - Model 4

Dependent variable: HMIBEPCT				
Model size: N = 60286, Parameters = 53, Df= 60233				
Residuals: SS= .2532058496E+11, SD= 648.36509				
Fit: R^2= .004961, Adjusted R^2 = .00410				
Model test: F[52, 60233] = 5.78, P-value = .00000				
Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	19.13776262	18.271101	1.047	.2949
AL	-16.48559687	29.134222	-.566	.5715
AK	-16.39110999	46.320681	-.354	.7234
AZ	-9.230560632	28.862347	-.320	.7491
AR	-15.96178303	33.794242	-.472	.6367
CA	117.1411273	19.535697	5.996	.0000
CT	62.95386957	28.688372	2.194	.0282
DE	-16.75877949	53.253318	-.315	.7530
DC	-10.43513910	54.721193	-.191	.8488
FL	21.53924511	21.470096	1.003	.3158
GA	-3.501448127	25.048058	-.140	.8888
HI	43.93624523	41.764954	1.052	.2928
ID	-11.70349879	43.481117	-.269	.7878
IL	4.100439640	22.209343	.185	.8535
IN	-17.19908084	26.436215	-.651	.5153
IA	-20.24019819	29.310482	-.691	.4899
KS	-16.87724029	32.087970	-.526	.5989
KY	-9.901801228	29.299699	-.338	.7354

LA	-12.73278361	28.965541	-.440	.6602
ME	.2395699296	43.349030	.006	.9956
MD	28.36860279	26.169627	1.084	.2784
MA	49.96673861	24.818656	2.013	.0441
MI	-11.29766287	23.461682	-.482	.6301
MN	-8.924286100	26.406317	-.338	.7354
MS	7.565486785	35.153014	.215	.8296
MO	-15.34644202	26.539371	-.578	.5631
MT	-16.58610560	49.247927	-.337	.7363
NE	-17.84268406	36.729374	-.486	.6271
NV	-14.10690955	38.747354	-.364	.7158
NH	128.8214884	41.213143	3.126	.0018
NJ	24.29297332	23.483524	1.034	.3009
NM	16.60942027	39.131970	.424	.6712
NY	7.785158390	20.942447	.372	.7101
NC	-9.923669119	24.967051	-.397	.6910
ND	-20.00290167	53.253302	-.376	.7072
OH	-8.317480642	22.714643	-.366	.7142
OK	-17.32951032	29.994002	-.578	.5634
OR	-11.18955621	29.965121	-.373	.7088
PA	-11.80597331	22.193010	-.532	.5947
RI	-9.257802392	45.426682	-.204	.8385
SC	-16.18846659	29.977816	-.540	.5892
SD	-20.40047945	46.837164	-.436	.6632
TN	-6.864322893	26.926677	-.255	.7988

TX	-2.328277094	20.942844	-.111	.9115
UT	-12.64579220	38.789508	-.326	.7444
VT	4.684871016	52.976044	.088	.9295
VA	8.292996510	24.924020	.333	.7393
WA	-5.433478409	25.545722	-.213	.8316
WV	-20.44774651	40.791767	-.501	.6162
WI	-9.184442103	26.620615	-.345	.7301
WY	-19.52151379	62.663432	-.312	.7554
OTHERST	-12.21881344	64.732593	-.189	.8503
INCOME	.6344922336E-04	.18376544E-04	3.453	.0006

Table 3.b. Tobit Regression Results (%)

Table 3.b.1. Tobit Regression Results (%) - Model 1

Dependent variable:	HMIBEPCT			
N	60286			
LL	-176592.6			
Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	-916.1900729	8.1451036	-112.484	.0000

Table 3.b.2. Tobit Regression Results (%) - Model 2

Dependent variable:	HMIBEPCT			
N	60286			
LL	-172921.6			
Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	-1489.017643	13.147949	-113.251	.0000
INCOME	.1111494949E-01	.15105895E-03	73.580	.0000

Table 3.b.3. Tobit Regression Results (%) - Model 3

Dependent variable:	HMIBEPCT			
N	60286			
LL	-176032.8			
Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	-953.0286250	43.947746	-21.685	.0000
AL	-180.1488313	72.195587	-2.495	.0126
AK	-241.3524084	118.71032	-2.033	.0420
AZ	91.12523228	67.597503	1.348	.1776
AR	-181.9786457	84.280084	-2.159	.0308
CA	365.7751555	46.248761	7.909	.0000
CT	276.7004885	65.857120	4.202	.0000
DE	51.31785255	124.74360	.411	.6808
DC	145.7613515	125.04175	1.166	.2437
FL	-38.35978403	51.588725	-.744	.4571
GA	72.36588245	59.152568	1.223	.2212
HI	117.2596867	97.814876	1.199	.2306
ID	-85.90785036	106.12242	-.810	.4182
IL	21.78946969	52.960880	.411	.6808
IN	-145.4976528	64.722734	-2.248	.0246
IA	-304.5309761	74.901498	-4.066	.0000
KS	-132.5041415	78.833778	-1.681	.0928
KY	-250.3617460	74.012321	-3.383	.0007
LA	-267.2945581	73.358149	-3.644	.0003
ME	-156.0421367	108.49862	-1.438	.1504

MD	305.5187829	59.913548	5.099	.0000
MA	218.1230166	57.860967	3.770	.0002
MI	12.99784464	55.877873	.233	.8161
MN	99.36143249	61.950352	1.604	.1087
MS	-283.5238865	91.122582	-3.111	.0019
MO	-146.3744359	65.019877	-2.251	.0244
MT	-324.6187555	130.04457	-2.496	.0126
NE	-287.8851269	94.765980	-3.038	.0024
NV	-22.10405511	92.769149	-.238	.8117
NH	282.4421724	94.491543	2.989	.0028
NJ	214.9594253	54.813176	3.922	.0001
NM	-113.0971085	96.942681	-1.167	.2434
NY	78.85957900	49.757891	1.585	.1130
NC	-42.55440639	59.969348	-.710	.4780
ND	-337.8028813	141.49054	-2.387	.0170
OH	-67.96072090	54.677872	-1.243	.2139
OK	-236.1290817	75.419911	-3.131	.0017
OR	116.4488235	69.769223	1.669	.0951
PA	-52.43856870	53.269514	-.984	.3249
RI	12.26300065	107.87104	.114	.9095
SC	-47.80981268	72.126569	-.663	.5074
SD	-798.8098476	150.37371	-5.312	.0000
TN	-284.9592878	68.208826	-4.178	.0000
TX	-233.5789424	51.129261	-4.568	.0000
UT	80.81904743	90.473773	.893	.3717

VT	36.13472184	125.36754	.288	.7732
VA	224.0805801	57.752276	3.880	.0001
WA	-10.27978262	61.083395	-.168	.8664
WV	-438.9772699	111.36257	-3.942	.0001
WI	-43.25451910	64.007458	-.676	.4992
WY	-366.5366457	168.93523	-2.170	.0300
OTHERST	-974.0789081	233.63066	-4.169	.0000

Table 3.b.4. Tobit Regression Results (%) - Model 4

Dependent variable: HMIBEPCT				
N = 60286				
LL -172529.2				
Variable	**Coefficient**	**SE**	**b/SE**	**P[|Z|>z]**
Constant	-1503.082751	47.121561	-31.898	.0000
AL	-127.3835708	75.721678	-1.682	.0925
AK	-252.3759906	126.56414	-1.994	.0461
AZ	151.0552524	70.730524	2.136	.0327
AR	-160.5614124	88.750331	-1.809	.0704
CA	342.4258253	48.465446	7.065	.0000
CT	193.0315693	69.111816	2.793	.0052
DE	7.357473806	129.78723	.057	.9548
DC	52.96416216	130.50900	.406	.6849
FL	-12.64612336	54.097858	-.234	.8152
GA	64.70049407	61.883701	1.046	.2958
HI	126.9234426	102.12418	1.243	.2139
ID	-19.19446462	111.24151	-.173	.8630
IL	-14.84574598	55.499066	-.267	.7891
IN	-107.4456458	67.769007	-1.585	.1129
IA	-237.6626870	78.488269	-3.028	.0025
KS	-106.6447702	82.752780	-1.289	.1975
KY	-199.9162403	77.951050	-2.565	.0103
LA	-248.9202677	77.680868	-3.204	.0014

ME	-104.8047503	113.59827	-.923	.3562
MD	238.7615020	62.545395	3.817	.0001
MA	178.1396303	60.649865	2.937	.0033
MI	14.76284473	58.487047	.252	.8007
MN	83.48371578	64.781785	1.289	.1975
MS	-237.0663573	96.068459	-2.468	.0136
MO	-100.5385328	68.019491	-1.478	.1394
MT	-208.3776457	137.68889	-1.513	.1302
NE	-210.6670994	99.239913	-2.123	.0338
NV	-38.12746751	97.773749	-.390	.6966
NH	228.9573304	99.020562	2.312	.0208
NJ	137.5178895	57.335231	2.398	.0165
NM	-52.20800454	102.20714	-.511	.6095
NY	17.30496224	52.147762	.332	.7400
NC	-20.28923257	62.767597	-.323	.7465
ND	-284.6592319	148.75719	-1.914	.0557
OH	-39.46704153	57.189221	-.690	.4901
OK	-164.2033183	79.448245	-2.067	.0388
OR	119.5273182	72.698659	1.644	.1001
PA	-65.05442943	55.782458	-1.166	.2435
RI	16.52372462	113.34631	.146	.8841
SC	-21.56865712	75.630082	-.285	.7755
SD	-734.3989035	158.54075	-4.632	.0000
TN	-220.2679858	71.579773	-3.077	.0021
TX	-237.4388302	53.832283	-4.411	.0000

UT	132.9507703	94.132105	1.412	.1578
VT	130.4229987	131.14173	.995	.3200
VA	152.3088052	60.392353	2.522	.0117
WA	-39.22217840	63.982238	-.613	.5399
WV	-412.2943476	118.15231	-3.490	.0005
WI	-47.21399599	67.100406	-.704	.4817
WY	-242.6292902	175.27815	-1.384	.1663
OTHERST	-785.1965620	239.94569	-3.272	.0011
INCOME	.1079836093E-01	.15025812E-03	71.865	.0000

Table 4. H1-H3 Test Results

Table 4.a. H1-H3 Test Results (Tobit)

Table 4.a.1. H1 Results (Tobit)

Model	**Model Description**	**Log Likelihood (*LL*)**	
		H1a ($)	**H1b (%)**
1	HMIBENE = F(Constant)[3]	-206,252.4	-176,592.6
2	HMIBENE = F(Constant + Income)	-191,122.7	-172,921.6

The ^{2} test statistic for H1a is: 2*[*LL*(2)-*LL*(1)] = 2*[-191,122.7-(-206,252.4)]=30,259.4.
The ^{2} test statistic for H1b is: 2*[*LL*(2)-*LL*(1)] = 2*[-172,921.6-(-176,592.6)]= 7,342.0.

Table 4.a.2. H2 Results (Tobit)

Model	**Model Description**	**Log Likelihood (*LL*)**	
		H2a ($)	**H2b (%)**
1	HMIBENE = F(Constant)	-206,252.4	-176,592.6
3	HMIBENE = F(Constant + State of Residence)	-200,834.8	-176,032.8

The ^{2} test statistic for H2a is: 2*[*LL*(3)-*LL*(1)]=2*[-200,834.8-(-206,252.4)]=10,835.2.
The ^{2} test statistic for H2b is: 2*[*LL*(3)-*LL*(1)]=2*[-176,032.8-(-176,592.6)]= 1,119.6.

Table 4.a.3. H3 Results (Tobit)

Model	**Model Description**	**Log Likelihood (*LL*)**	
		H3a ($)	**H3b (%)**
2	HMIBENE = F(Constant + Income)	-191,122.7	-172,921.6
4	HMIBENE = F(Constant + Income + State of Residence)	-190,088.9	-172,529.2

The ^{2} test statistic for H3a is: 2*[*LL*(4)-*LL*(2)] = 2*[-190,088.9-(-191,122.7)]=2,067.6.
The ^{2} test statistic for H3b is: 2*[*LL*(4)-*LL*(2)] = 2*[-172,529.2-(-172,921.6)]= 784.8.

Table 4.a. H1-H3 Test Results (Tobit, continued)

[3]Where the constant equals one.

Table 4.a.4. Summary of Hypothesis Test Results (Tobit)

Hypothesis Test	^{2}		***P*[|*Z*|>*z*]**	
	a ($)	**b (%)**	**a ($)**	**b (%)**
1	30,259.4	7,342.0	0.0000	0.0000
2	10,835.2	1,119.6	0.0000	0.0000
3	2067.6	748.8	0.0000	0.0000

Table 4.b. H1-H3 Test Results (OLS)

Table 4.b.1. H1 Results (OLS)

Model	Model Description	R^2	
		H1a ($)	H1b (%)
1	HMIBENE = F(Constant)[4]	0.00000	0.00000
2	HMIBENE = F(Constant + Income)	.041755	.000177

F_{H1a}= [(.041755-0)/(1-.041755)]*[(60,286-0-1-1)/(1)]=2,626.842
F_{H1b}= [(.000177-0)/(1-.000177)]*[(60,286-0-1-1)/(1)]= 10.672

Table 4.b.2. H2 Results (OLS)

Model	Model Description	R^2	
		H2a ($)	H2b (%)
1	HMIBENE = F(Constant)	0.00000	0.00000
3	HMIBENE = F(Constant + State of Residence)	.041562	.004764

F_{H2a}= [(.041562-0)/(1-.041562)]*[(60,286-0-51-1)/(51)]=51.216
F_{H2b}= [(.004764-0)/(1-.004764)]*[(60,286-0-51-1)/(51)]= 5.653

Table 4.b.3. H3 Results (OLS)

Model	Model Description	R^2	
		H2a ($)	H2b (%)
2	HMIBENE = F(Constant + Income)	.041755	.000177
4	HMIBENE = F(Constant + Income + State of Residence)	.083146	.004961

F_{H3a}= [(.083146-.041755)/(1-.083146)]*[(60,286-1-51-1)/(52)]=522.922
F_{H3b}= [(.004961-.000177)/(1-.004961)]*[(60,286-1-51-1)/(52)]= 5.569
Table 4.b. H1-H3 Test Results (OLS, continued)

[4]Where the constant equals one.

Table 4.b.4. Summary of Hypothesis Test Results (OLS)

Hypothesis Test	***R^2***		***$P[\|Z\|>z]$***	
	H2a ($)	**H2b (%)**	**H2a ($)**	**H2b (%)**
1	2,626.842	10.672	.00000	.00108
2	51.216	5.653	.00000	.00000
3	522.922	5.569	.00000	.00000

Table 5. IMF to TAXSIM Data Conversion

TAXSIM Variable Description	**IMF Variable Description**	**IMF Variable**	**Recode**
Case ID	N/A	N/A	N/A
Tax year	Tax year	N/A	1992
State (see list below)	State	STATE92	N/A
Marital Status (see list below)	Filing Status	MARS92	Minor[5]
Dependent Exemptions (number of children)	Dependent Exemptions	Sum of XO****92	N/A
Age exemptions (number of taxpayers over 65 years of age)	Elderly/ Blind	AGEX	Minor
Wage and salary income of Taxpayer	Salary & Wages	E92_2	(2/3)(E92_2)
Wage and salary income of Spouse	Salary & Wages	E92_2	(1/3)(E92_2)
Dividend income	Dividends	E92_5	N/A
Other property income, including Self-employment, may be negative.	Various	Various	AGI - others
Pensions	Pensions & Annuities Incl.	E92_14	N/A
Gross Social Security Income	Gross SSI Benes	E92_18	N/A
Other transfer Income (Welfare, municipal bond interest)	Tax Exempt Interest	E92_4	N/A
Rent Paid (for state property tax rebates)	none	none	N/A
Property taxes paid	Real Estate Tax	E92_77	N/A
Itemized deductions except state income tax and local property tax	Various	Various	N/A[6]
Child care expenses			

[5]TAXSIM only recognizes the following three filing statuses: single, joint, and head of household (single parent). This necessitated recoding married filing separate and qualifying widow(er) as as single.

[6]This variable was the sum of Itemized deductions both including and excluding HMI deducted, always excluding the amount of state income tax.

Table 6. Effect of State Residence on HMI Deduction $ Benefit

Table 6.a. Effect of State Residence on HMI Deduction $ Benefit w/o Income Partialled

Winners:

State	Coeff.	*P*[*Z* >*z*]
CA	1,629	0.0000
MD	1,418	0.0000
CT	1,226	0.0000
VA	1,106	0.0000
NJ	984	0.0000
DC	915	0.0161
MA	843	0.0000
HI	704	0.0179
NH	579	0.0478
MN	363	0.0556
NY	290	0.0567
DE	274	0.4718
AZ	260	0.2093
GA	247	0.1725
RI	228	0.4880
UT	200	0.4709
NV	188	0.5042
OR	180	0.4029
IL	147	0.3653
WA	92	0.6209

State	Coeff.	*P*[*Z* >*z*]
MI	(62)	0.7164
VT	(100)	0.7951
NC	(179)	0.3289
PA	(196)	0.2288
SC	(230)	0.2979
FL	(278)	0.0786
WI	(286)	0.1452
OH	(372)	0.0264
ID	(403)	0.2157
ME	(583)	0.0781
IN	(661)	0.0009
KS	(663)	0.0062
NM	(670)	0.0249
MO	(736)	0.0002
AL	(753)	0.0007
AR	(851)	0.0010
AK	(851)	0.0184
TX	(865)	0.0000
LA	(1,045)	0.0000
OK	(1,071)	0.0000
KY	(1,103)	0.0000
TN	(1,187)	0.0000
NE	(1,239)	0.0000
IA	(1,359)	0.0000
MS	(1,391)	0.0000
MT	(1,420)	0.0004
ND	(1,447)	0.0009
WV	(1,619)	0.0000
WY	(1,664)	0.0015
SD	(2,980)	0.0000
OTHERST	(3,695)	0.0000

Losers:

Table 6.b. Effect of State Residence on HMI Deduction $ Benefit w/ Income Partialled

Winners:

State	Coeff.	*P*[*Z* >*z*]
CA	1,429	0.0000
MD	990	0.0000
HI	789	0.0007
CT	757	0.0000
VA	703	0.0000
MA	590	0.0000
NJ	559	0.0000
DC	488	0.1041
AZ	457	0.0057
UT	373	0.0894
RI	303	0.2468
VT	294	0.3404
MN	259	0.0867
NH	221	0.3437
GA	191	0.1867
NV	163	0.4702
OR	100	0.5562
DE	59	0.8439
IL	22	0.8627
WA	1	0.9956

Losers:

State	Coeff.	*P*[*Z* >*z*]
NY	(12)	0.9215
NC	(15)	0.9183
SC	(38)	0.8310
MI	(45)	0.7413
ID	(64)	0.8071
FL	(131)	0.2999
OH	(167)	0.2110
PA	(186)	0.1531
ME	(200)	0.4488
WI	(251)	0.1105
NM	(301)	0.2127
AL	(366)	0.0391
IN	(375)	0.0180
MO	(428)	0.0074
KS	(482)	0.0134
AR	(633)	0.0025
OK	(656)	0.0005
KY	(696)	0.0002
TN	(701)	0.0000
AK	(709)	0.0175
NE	(710)	0.0024
TX	(727)	0.0000
MT	(777)	0.0175
LA	(789)	0.0000
IA	(861)	0.0000
WY	(956)	0.0215
MS	(986)	0.0000
ND	(1,069)	0.0025
WV	(1,132)	0.0000
OTHERST	(2,089)	0.0002
SD	(2,194)	0.0000

Table 7. Estimated Size and Distribution of the HMI Deduction by Income Class (for 1995)

Income (AGI) Group	Est. No. of Taxpayers in Group Claiming Deduction	Est. Share of Taxpayers in Group Claiming Deduction
Under $ 5,000	108,084	0.61%
$ 5,000 under $ 10,000	352,380	2.28%
$ 10,000 under $ 15,000	670,820	4.66%
$ 15,000 under $ 20,000	1,058,114	8.85%
$ 20,000 under $ 25,000	1,447,665	14.77%
$ 25,000 under $ 30,000	1,850,066	23.14%
$ 30,000 under $ 40,000	4,419,847	35.11%
$ 40,000 under $ 50,000	4,652,321	51.73%
$ 50,000 under $ 75,000	7,673,964	69.45%
$ 75,000 under $ 100,000	2,684,288	79.10%
$ 100,000 under $ 200,000	1,888,855	78.59%
$ 200,000 under $ 500,000	506,269	76.45%
$ 500,000 under $ 1,000,000	87,224	69.88%
$ 1,000,000 or more	37,209	63.73%
Total	27,432,963	23.50%

Income (AGI) Group	Est. Total Amount of Deduction ($ Thousands)	Est. Avg. Deduction per Taxpayer Claiming Deduction
Under $ 5,000	$ 859,877	$ 7,956
$ 5,000 under $ 10,000	2,248,869	6,382
$ 10,000 under $ 15,000	4,069,670	6,067
$ 15,000 under $ 20,000	6,814,256	6,440
$ 20,000 under $ 25,000	8,778,504	6,064
$ 25,000 under $ 30,000	11,370,651	6,146
$ 30,000 under $ 40,000	29,340,151	6,638
$ 40,000 under $ 50,000	33,570,993	7,216
$ 50,000 under $ 75,000	64,376,528	8,389
$ 75,000 under $ 100,000	29,772,648	11,091
$ 100,000 under $ 200,000	30,118,974	15,946
$ 200,000 under $ 500,000	12,259,783	24,216
$ 500,000 under $ 1,000,000	2,929,697	33,588
$ 1,000,000 or more	1,613,897	43,374
Total	$ 238,302,492	$ 8,687

Source: Tax Foundation (1994)

Table 8. Tax Savings from Itemized Deductions

1994 Levels

Income Group ($-000)	All Itemized Ded. % of $ Benefits	All Itemized Ded. Average Benefit	Mortgage Interest % of $ Benefits	Mortgage Interest Average Benefit
<$ 10	0.0%	$ 2	0.0%	$ 0.0
$ 10-20	0.4%	13	0.4%	7.2
$ 20-30	1.4%	53	1.5%	38.6
$ 30-40	3.2%	155	3.8%	116.7
$ 40-50	4.5%	300	6.3%	269.7
$ 50-75	18.0%	801	22.0%	625.5
$ 75-100	18.0%	1,921	21.9%	1,496.3
$ 100-200	26.7%	3,969	27.6%	2,628.4
$ 200+	27.8%	15,698	16.5%	5,968.8

Notes: Averages include all taxpayers in each group (including those who do not benefit from the deductions). "All itemized deductions" includes listed items plus casualty losses. The total is less than the sum of the individual items because of an offset for the standard deduction. Source: Joint Committee on Taxation (1994); Citizens for Tax Justice (1995).

Table 9. Federal Tax Expenditures

Table 9.a. Tax Expenditures, Fiscal 1995-1999, A Detailed List ($ -billions)

Corporations & Individuals Combined	Corporations & Individuals					
	1995	1996	1997	1998	1999	1995-99
TOTAL, ALL TAX EXPENDITURES	$455.4	$483.1	$508.3	$535.1	$564.8	$2,546.8

Personal Tax Expenditures	Individuals only					
	1995	1996	1997	1998	1999	1995-99
TOTAL, ALL INDIVIDUAL TAX EXPENDITURES	$390.5	$417.3	$442.0	$467.1	$494.6	$2,211.4
ITEMIZED DEDUCTIONS:	$ 82.1	$ 86.9	$ 92.0	$ 97.3	$103.0	$ 461.3
Mortgage interest	**52.4**	**55.5**	**58.7**	**62.2**	**65.9**	**$ 294.6**
State & local taxes (w/o home property)	26.0	27.5	29.1	30.7	32.5	$ 145.8
Property taxes (homes)	14.3	15.1	15.9	16.9	17.8	$ 80.0
Charitable contributions	17.2	18.2	19.2	20.2	21.3	$ 96.1
Medical expenses	3.9	4.2	4.6	5.1	5.5	$ 23.3
Casualty losses	0.4	0.3	0.2	0.2	0.2	$ 1.3
Std. ded. offset	-32.0	-33.9	-35.8	-37.9	-40.1	$-179.7
EMPLOYER-PAID HEALTH INSURANCE	$ 53.4	$ 58.5	$ 63.3	$ 68.6	$ 74.5	$ 318.4
EARNED-INCOME TAX CREDIT	$ 22.0	$ 25.2	$ 27.5	$ 28.6	$ 29.8	$ 133.1
SOCIAL SECURITY ETC.	$ 23.0	$ 23.9	$ 24.9	$ 26.1	$ 27.2	$ 125.1
CAPITAL GAINS ON HOMES	$ 20.9	$ 21.7	$ 22.3	$ 23.0	$ 23.7	$ 111.7
Deferral of capital gains on home sales	16.0	16.6	17.0	17.6	18.1	$ 85.3
Exclusion of capital gains on home sales for persons >age 55	4.9	5.1	5.3	5.5	5.6	$ 26.4
MEDICARE	$ 13.1	$ 15.3	$ 18.1	$ 21.3	$ 25.2	$ 92.9
OTHER FRINGE BENEFITS	$ 15.4	$ 16.4	$ 17.7	$ 19.0	$ 20.6	$ 89.1
WORKMEN'S COMP., ETC.	$ 4.8	$ 5.1	$ 5.3	$ 5.6	$ 5.9	$ 26.7
SOLDIERS & VETERANS	$ 4.1	$ 4.1	$ 4.2	$ 4.3	$ 4.5	$ 21.2
CREDIT FOR CHILD AND DEPENDENT CARE EXPENSES	$ 2.8	$ 2.9	$ 2.9	$ 3.0	$ 3.1	$ 14.7
ELDERLY & BLIND STD. DEDUCTION, ETC.	$ 1.8	$ 1.8	$ 1.9	$ 1.9	$ 2.0	$ 9.4
OTHER PERSONAL	$ 1.7	$ 1.7	$ 1.8	$ 1.9	$ 2.0	$ 9.1
TOTAL, PERSONAL:	$245.1	$263.6	$282.0	$300.6	$321.5	$1,412.7

Sources: Citizens for Tax Justice (1995). Except where an item is listed in only one source, figures are averages from the Joint Committee on Taxation, Estimates of Federal Tax Expenditures for Fiscal Years 1995-1999, Nov. 9, 1984, and Office of Management and Budget, Budget of the United State Government, Fiscal Year 1996, Analytical Perspectives, Tax Expenditures (Feb. 1995).

Table 9.b. Tax Expenditures, 1995-1999 Summary Cost Table (fiscal years, $ -billions)

	1995 Corp.	1995 Individ.	1995 Total
TOTAL ALL ITEMS	$ 65.0	$ 390.5	$ 455.4
Total as a % of Income Taxes	45%	65%	61%
Business & Investment			
Capital gains (except homes)	$ 0.4	$ 29.2	$ 29.6
Accelerated depreciation	23.3	9.8	33.1
Tax free bonds, public & private	6.6	13.6	20.1
Insurance cos. & products	4.7	10.2	14.9
Multinational	8.9	1.9	10.8
Business meals & entertainment	3.3	2.0	5.2
Oil, gas, energy	2.6	0.7	3.3
Low-income housing credit	0.6	1.6	2.2
R&D tax breaks	2.8	0.1	2.9
Timber, agriculture, minerals	0.7	0.5	1.2
Special ESOP rules	1.4	--	1.4
Financial institutions (non-insur.)	0.9	--	0.9
Installment sales	0.3	0.5	0.8
Empowerment zones	0.1	0.2	0.3
Other business & investment	8.5	1.7	10.2
Subtotal, business & investment:	$ 65.2	$ 71.8	$ 137.0
Pensions, Keoghs, IRAs	--	$ 73.6	$ 73.6
Total, business, investment & savings:	$ 65.0	$ 145.4	$ 210.6

TOTAL ALL ITEMS	$ 335.4	$ 2,211.4	$ 2,546.8
Total as a % of Income Taxes	44%	66%	62%
Business & Investment			
Capital gains (except homes)	$ 2.5	$ 164.6	$ 165.2
Accelerated depreciation	114.5	47.6	162.1
Tax free bonds, public & private	34.0	71.7	105.6
Insurance cos. & products	27.6	60.2	87.8
Multinational	46.6	10.4	57.1
Business meals & entertainment	18.0	10.8	28.7
Oil, gas, energy	14.7	3.9	18.6
Low-income housing credit	4.1	10.6	14.7
R&D tax breaks	10.0	0.3	10.3
Timber, agriculture, minerals	4.0	2.8	6.7
Special ESOP rules	6.6	--	6.6
Financial institutions (non-insur.)	4.9	--	4.9
Installment sales	1.7	2.7	4.4
Empowerment zones	1.0	1.5	2.5
Other business & investment	45.3	9.1	54.4
Subtotal, business & investment:	$ 336.4	$ 396.0	$ 732.5
Pensions, Keoghs, IRAs	--	$ 402.7	$ 402.7
Total, business, investment & savings:	$ 335.4	$ 798.7	$ 1,134.1

	Individuals only 1995	Individuals only 1995-1999

	----	---------
Personal (non-investment)		
Itemized deductions (net)	$ 82.1	$ 461.3
Employer-paid health insurance	53.4	318.4
Earned-income tax credit	22.0	133.1
Social Security, etc.	23.0	125.1
Capital gains on homes	20.9	111.7
Medicare	13.1	92.9
Other fringe benefits	15.4	89.1
Workmen's compensation, etc.	4.8	26.7
Soldiers & veterans	4.1	21.2
Child-care credit	2.8	14.7
Elderly & blind std. deduction, etc.	1.8	9.4
Other personal	1.7	9.1
Total, personal	$ 245.1	$ 1,412.7
Addendum: Itemized deductions		
Mortgage interest	**$ 52.4**	**$ 294.6**
S&L taxes (w/o home property)	26.0	145.8
Property taxes (homes)	14.3	80.0
Charitable contributions	17.2	96.1
Medical expenses	3.9	23.3
Casualty losses	0.4	1.3
Total before standard deduction offset	$ 114.1	$ 641.1
Net Itemized Deductions	$ 82.1	$ 461.3

Sources: Office of Management and Budget, Budget of the United States Government, Fiscal Year 1996, Analytical Perspectives, Tax Expenditures (Feb. 1995). Joint Committee on Taxation, Estimates of Federal Tax Expenditures far Fiscal Years 1995-1999, Nov. 9, 1994. Also used in Citizens for Tax justice (March 1995).

Table 10. Critical Housing Issue & Effect of HMI Deduction by Income Group

Level of Household Wealth/Income:	**Low**	**High**
Critical Housing Issue:	Rent v. buy?	Finance with existing v. borrowed funds?
Effect of HMI deduction:	Increase disadvantage of low wealth households	Decrease advantage of high wealth households

Table 11. Tax Return Statistical (CTJ) Variables

Description of Variable	**Variable Name**	**Model Position**
The average reduction in federal income tax from the deduction for home mortgage interest for all individual filers	HMIB	Dependent
The average state income tax deduction taken for all individual filers with the deduction	ASIT_W	Independent (State Tax)
The approximate average local income tax deduction available for all individual filers with the deduction (limited to residents of New York City and Yonkers, NY)	LOCIT	Independent (State Tax)

Table 12. PUMS/CTJ Matching Criteria

				Marital Status	
				Married	**Single**
Age	Elderly	**Dependent ExempExemptions**	Combined Dependent Exemption Statuses	Married, Elderly, No Dependents (1)	Elderly, Single & HOH (2)
	N o N o n Non- Elderly		Dependents	Marrried with Dependents, Nonelderly (3)	Head of Household, Nonelderly (4)
			None	Married, No Dependents, Nonelderly (5)	Single or Married filing Separately, Nonelderly (6)

Table 13. 204 Cell CTJ & PUMS Matching

Matching Criteria	Levels	Level Descriptions
Filing Status	3	Single Married Head of Household
Dependent Status	2	No Dependents Dependents
Age	2	Non-Elderly (Age<65) Elderly
Qualifier Income	17	<$1,000 $1,000-5,000 $5,000-10,000 $10,000-15,000 $15,000-20,000 $20,000-25,000 $25,000-30,000 $30,000-40,000 $40,000-50,000 $50,000-60,000 $60,000-70,000 $70,000-80,000 $80,000-90,000 $90,000-100,000 $100,000-150,000 $150,000-200,000 $200,000+

Table 14. Univariate Descriptive Statistics for Model Variables

Variable	Mean	*SD*	Min.	Maximum	Cases	Skew.	Kurt.
Dependent:							
HMIB	263.140	708.30	0.00	7737.11	16000	4.345	27.783
Personal Characteristics:							
Vital Characteristics							
AGE	49.250	17.75	16.00	90.00	16000	0.359	2.085
AGE2	2740.631	1887.00	256.00	8100.00	16000	0.840	2.745
DRACEO	0.071	0.26	0.00	1.00	16000	3.354	12.247
DRACEW	0.867	0.34	0.00	1.00	16000	-2.166	5.693
SEX	0.388	0.49	0.00	1.00	16000	0.459	1.211
Other Individual Characteristics							
CLASSINC	31810.514	30953.88	-9999.00	468539.00	16000	3.058	20.860
DEPEXEM	0.853	1.20	0.00	11.00	16000	1.640	6.669
MARSTAT	0.607	0.49	0.00	1.00	16000	-0.438	1.192
Educational Attainment							
HSCH	0.283	0.45	0.00	1.00	16000	0.965	1.931
SOMECOLL	0.205	0.40	0.00	1.00	16000	1.461	3.134
COLL	0.181	0.39	0.00	1.00	16000	1.657	3.744
ADVCOLL	0.077	0.27	0.00	1.00	16000	3.165	11.018
Occupation							
FARMFISH	0.031	0.17	0.00	1.00	16000	5.394	30.094
MILITARY	0.002	0.05	0.00	1.00	16000	20.180	408.233
OPERLABR	0.130	0.34	0.00	1.00	16000	2.196	5.823
PRECTRAD	0.114	0.32	0.00	1.00	16000	2.423	6.872
PROFEXEC	0.214	0.41	0.00	1.00	16000	1.397	2.950
SERVICE	0.095	0.29	0.00	1.00	16000	2.761	8.624
TECHSALE	0.218	0.41	0.00	1.00	16000	1.368	2.871
State Characteristic Factor Scores:							
FAC1st	2.935e-13	1.00	-2.20	1.67	16000	-0.126	2.111
FAC2st	1.310e-12	1.00	-1.45	2.25	16000	0.091	1.461
FAC3st	-8.384e-13	1.00	-1.54	2.31	16000	0.529	2.331
FAC4st	1.602e-12	1.00	-1.72	1.25	16000	-0.300	1.458
FAC5st	1.215e-12	1.00	-2.56	1.06	16000	-1.099	2.989
State Dummies							
STCA	0.125	0.33	0.00	1.00	16000	2.268	6.143
STCO	0.125	0.33	0.00	1.00	16000	2.268	6.143
STFL	0.125	0.33	0.00	1.00	16000	2.268	6.143
STIA	0.125	0.33	0.00	1.00	16000	2.268	6.143
STIL	0.125	0.33	0.00	1.00	16000	2.268	6.143
STKY	0.125	0.33	0.00	1.00	16000	2.268	6.143
STNY	0.125	0.33	0.00	1.00	16000	2.268	6.143
STTX	0.125	0.33	0.00	1.00	16000	2.268	6.143

Table 15. Descriptive Statistics for HMIB by State

Statistic	**CA**	**CO**	**FL**	**IA**	**IL**	**KY**	**NY**	**TX**
Mean	624.40	366.29	199.77	83.97	269.47	124.55	248.01	188.67
Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Variance	1710535	550848	260087	54763	435723	128604	399020	273254
Std. Deviation	1307.87	742.19	509.99	234.01	660.09	358.61	631.68	522.74
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	7737.11	6353.54	4583.25	2263.29	4170.16	3942.78	5089.71	4397.57
Range	7737.11	6353.54	4583.25	2263.29	4170.16	3942.78	5089.71	4397.57
Skewness	2.699	2.753	3.989	4.434	3.532	4.339	3.728	4.210
Kurtosis	7.899	8.873	20.120	25.382	14.107	25.302	17.400	21.926

Table 16. Regression Variable Correlations

	HMIB	MARSTAT	DEPEXEM	CLASSINC	AGE	SEX	AGE2	DRACEW	DRACEO	HSCH	SOMECOLL	COLL	ADVCOLL	PROFEXEC	TECHSALE
HMIB	1.000														
MARSTAT	0.274	1.000													
DEPEXEM	0.145	0.213	1.000												
CLASSINC	0.733	0.443	0.109	1.000											
AGE	-0.121	-0.124	-0.393	-0.099	1.000										
SEX	-0.150	-0.478	-0.103	-0.243	0.122	1.000									
AGE2	-0.151	-0.163	-0.408	-0.140	0.987	0.138	1.000								
DRACEW	0.047	0.091	-0.177	0.108	0.110	-0.062	0.113	1.000							
DRACEO	-0.056	-0.134	0.081	-0.101	-0.050	0.103	-0.053	-0.705	1.000						
HSCH	-0.113	0.017	-0.015	-0.094	-0.020	0.008	-0.024	0.050	-0.022	1.000					
SOMECOLL	0.010	-0.005	0.010	0.019	-0.105	0.003	-0.101	0.027	0.007	-0.319	1.000				
COLL	0.155	0.049	0.023	0.196	-0.167	-0.023	-0.170	0.032	-0.031	-0.295	-0.239	1.000			
ADVCOLL	0.243	0.089	0.013	0.293	-0.020	-0.060	-0.036	0.032	-0.042	-0.182	-0.147	-0.136	1.000		
PROFEXEC	0.272	0.138	0.045	0.338	-0.148	-0.024	-0.169	0.045	-0.045	-0.193	-0.017	0.270	0.374	1.000	
TECHSALE	0.042	-0.009	-0.007	0.064	-0.150	0.147	-0.158	0.030	-0.009	0.028	0.140	0.083	-0.076	-0.275	1.000
SERVICE	-0.072	-0.084	0.020	-0.124	-0.054	0.107	-0.057	-0.091	0.082	0.043	-0.006	-0.067	-0.075	-0.169	-0.171
FARMFISH	-0.050	0.048	-0.002	-0.037	0.016	-0.114	0.013	0.016	-0.028	0.021	-0.030	-0.040	-0.034	-0.094	-0.095
PRECTRAD	-0.017	0.135	0.089	0.013	-0.141	-0.245	-0.147	0.018	-0.034	0.091	0.007	-0.061	-0.088	-0.187	-0.190
OPERLABR	-0.066	0.091	0.109	-0.054	-0.143	-0.158	-0.149	-0.042	0.012	0.104	-0.031	-0.121	-0.099	-0.202	-0.204
MILITARY	-0.010	0.029	0.027	-0.004	-0.043	-0.039	-0.039	-0.018	0.026	0.008	0.006	0.013	-0.005	-0.026	-0.026
STCA	0.193	-0.003	0.024	0.074	-0.035	-0.018	-0.036	-0.134	-0.012	-0.071	0.043	0.042	0.024	0.034	0.027
STFL	-0.034	-0.029	-0.057	-0.013	0.041	0.021	0.043	0.006	0.049	-0.006	0.003	0.004	-0.001	-0.002	0.021
STIL	0.003	-0.007	0.005	0.032	0.013	-0.008	0.011	0.001	0.030	0.021	0.001	-0.007	0.001	-0.003	-0.014
STIA	-0.096	0.034	-0.011	-0.052	0.045	-0.007	0.049	0.131	-0.093	0.088	-0.029	-0.015	-0.039	-0.050	-0.019
STKY	-0.074	0.017	-0.002	-0.072	0.006	0.001	0.010	0.079	-0.024	0.005	-0.045	-0.058	-0.027	-0.046	-0.041

STNY	-0.008	-0.024	0.018	0.032	0.018	0.032	0.015	-0.053	0.057	0.000	-0.032	0.007	0.020	0.024	-0.001
STTX	-0.040	0.007	0.030	-0.021	-0.040	-0.013	-0.039	-0.076	0.049	-0.021	0.019	-0.009	-0.012	0.004	-0.006
STCO	0.055	0.004	-0.008	0.019	-0.049	-0.010	-0.051	0.046	-0.057	-0.016	0.039	0.036	0.033	0.039	0.034
FAC1st	0.118	-0.060	0.029	0.039	-0.046	0.016	-0.048	-0.216	0.090	-0.081	0.046	0.037	0.026	0.047	0.030
FAC2st	-0.020	-0.004	-0.022	0.036	-0.014	-0.004	-0.017	-0.005	0.059	-0.015	0.026	0.014	0.021	0.032	0.022
FAC3st	0.114	0.026	0.014	0.040	-0.076	-0.033	-0.077	0.011	-0.064	-0.047	0.042	0.020	0.027	0.029	0.018
FAC4st	0.064	-0.006	-0.030	0.028	0.002	-0.000	0.003	0.009	-0.054	0.003	0.035	0.051	0.015	0.021	0.045
FAC5st	-0.0109	-0.0482	-0.036	-0.0108	0.024	0.032	0.024	0.0237	0.0282	0.0029	-0.014	-0.004	0.008	-0.0037	0.0075

Table 16. Regression Variable Correlations (Continued)

	SERVICE	FARMFISHP	RECTRAD	OPERLABR	MILITARY	STCA	STFL	STIL	STIA	STKY	STNY	STTX	STCO	FAC1st	FAC2st	FAC3st	FAC4st
SERVICE	1.000																
FARMFISH	-0.058	1.000															
PRECTRAD	-0.116	-0.064	1.000														
OPERLABR	-0.125	-0.069	-0.139	1.000													
MILITARY	-0.016	-0.009	-0.018	-0.019	1.000												
STCA	-0.012	-0.009	-0.011	-0.026	0.012	1.000											
STFL	0.008	-0.022	-0.009	-0.046	-0.003	-0.143	1.000										
STIL	-0.007	-0.018	-0.000	0.033	-0.007	-0.143	-0.143	1.000									
STIA	0.006	0.085	0.003	0.037	-0.019	-0.143	-0.143	-0.143	1.000								
STKY	-0.015	0.012	0.020	0.046	0.000	-0.143	-0.143	-0.143	-0.143	1.000							
STNY	0.015	-0.045	-0.019	-0.025	-0.015	-0.143	-0.143	-0.143	-0.143	-0.143	1.000						
STTX	0.010	0.001	0.023	0.002	0.004	-0.143	-0.143	-0.143	-0.143	-0.143	-0.143	1.000					
STCO	-0.006	-0.004	-0.006	-0.022	0.027	-0.143	-0.143	-0.143	-0.143	-0.143	-0.143	-0.143	1.000				
FAC1st	0.011	-0.067	-0.015	-0.046	0.012	0.599	-0.109	0.077	-0.622	-0.444	0.364	0.188	-0.053	1.000			
FAC2st	0.004	-0.033	0.005	-0.032	0.009	-0.520	0.534	0.138	-0.383	-0.297	-0.203	0.457	0.274	0.000	1.000		
FAC3st	-0.022	0.004	0.010	0.007	0.032	0.229	-0.360	-0.072	-0.300	0.293	-0.491	-0.027	0.729	0.000	0.000	1.000	
FAC4st	0.007	0.026	-0.021	-0.048	0.007	0.289	0.357	-0.425	0.410	-0.600	-0.115	-0.278	0.363	0.000	0.000	0.000	1.000
FAC5st	0.001	-0.045	-0.0193	-0.0113	0.0005	-0.111	0.3555	0.3156	-0.337	0.1465	0.2568	-0.814	0.187	0	0	0	0

Table 17. Classifier Income (Variable name CLASSINC) Definition

Income Classifiers	**Federal AGI**	**Tax Return Total Income**	**Classifier Income**
Tax Return Items:			
Wages	YES	YES	YES
Taxable Interest	YES	YES	YES
Tax-exempt Interest	NO	NO	YES
Dividends	YES	YES	YES
State Tax Refunds	YES	YES	NO
Alimony Received	YES	YES	YES
Schedule C (Self-employed) Income or Loss	YES*	YES*	YES**
Cap. Gain Realizations & Allowed Cap. Loss	YES	YES	NO
Other Gains & Losses	YES	YES	NO
Ira Distributions (Taxable)	YES	YES	NO
Pensions & Annuities (Taxable)	YES	YES	YES
Rents, Partnerships, S Corps, Trusts	YES*	YES*	YES**
Farm Income or Loss	YES*	YES*	YES**
Unemployment Benefits	YES	YES	YES
Social Security Benefits, Total	Taxable only	Taxable only	YES**
Other Income or Loss in AGI	YES	YES	YES**
Less: Alimony Paid	YES	NO	NO
Less: Other Adjustments	YES	NO	NO
Non-tax-return Items:			
Public Assistance	NO	NO	YES
Supplemental Security Income	NO	NO	YES
Workers' Compensation	NO	NO	YES
Va Benefits	NO	NO	YES
Child Support (Private)	NO	NO	YES
Other Private Financial Assistance	NO	NO	YES

* as reported on tax return

** as define in the Citizens for Tax Justice standard classifier income measure (CTJ4)

Table 18. Educational Attainment Categories

Variable Value	Category with respect to educational attainment
00	N/A (less than 3 years old)
01	No school completed
02	Nursery school
03	Kindergarten
04	1st, 2nd, 3rd, or 4th grade
05	5th, 6th, 7th, or 8th grade
06	9th grade
07	10th grade
08	11th grade
09	12th grade, no diploma
10	High school graduate, diploma or GED
11	Some college, but no degree
12	Associate degree in college, occupational program
13	Associate degree in college, academic program
14	Bachelor's degree
15	Master's degree
16	Professional degree
17	Doctorate degree

Table 19. RELAT1 Variable Detail

Relationship to Householder		RELAT1 Value
Related:		
	Householder	00
	Husband/wife	01
	Son/daughter	02
	Stepson/stepdaughter	03
	Brother/sister	04
	Father/mother	05
	Grandchild	06
	Other relative	07
Not related:		
	Roomer/boarder/foster child	08
	Housemate/roommate	09
	Unmarried partner	10
	Other nonrelative	11
Group quarters:		
	Institutionalized person	12
	Other persons in group quarters	13

Table 20. State Variables

Variable Description/Calculation	Name	Source
Personal Characteristics:		
Resident Population, 65 Years and Older 1990 (April 1)	AGE64	SA
(Male Persons/All Persons)*100	MALE	SS
(White Persons/All Persons)*100	WHPOP	SS
(White Householders/All Householders)*100	WHHH	SS
(Black Householders/All Householders)*100	BLKHH	SS
Housing Demographics & Economic Characteristics:		
Bankruptcy Filings/All Persons (_BNKRP_/POP)	BNKPOP	SA
Median Value of Owner-occupied Housing Units	MEDVAL	SS
Median Contract Rent for Renter-occupied Housing Units	MEDRNT	SS
Resident Population in Metro Areas 1990 (%)	METRO	SA
Personal Income Per Capita in Current Dollars, in 1990	PERINC	SA
Persons per Square Mile of Land Area in 1990	PPSQMI	SA
(Vacant Housing Units/all Housing Units)*100	VACAN	SS
Home ownership Rates in 1990	OWNHM	SA
Home Value	PROPVAL	PUMS
Mortgage Market Characteristics:		
Percent of Loans with Installments past Due	PASDUA	MBA
Percent of Loans in Foreclosure (Ending Inventory)	FORCLOA	MBA
VA Loans as a Percent of All Loans	VALOAN	MBA
FHA Loans as a Percent of All Loans	FHALOAN	MBA
Adjustable Rate Loans (%)	ARLNS	FHFB
Conventional Mortgage Rates & Terms:		
Contract Interest Rate (%)	KINRT	FHFB
Initial Fees and Charges (%)	INITFEE	FHFB
Effective Interest Rate (%)	EFINTRT	FHFB
Term to Maturity (Years)	MATYRS	FHFB
Purchase Price ($000)	PURPRK	FHFB
Loan-to-Price Ratio (%)	LNPR	FHFB
Second mortgage payment (proxy Texas Homestead Law)	MORTG2	PUMS
Tax Characteristics:		
Local Income Tax	LOCIT	NY,ACIR
Property Tax Payments on Home	PTAX	PUMS
State Income Tax	ASITW	CTJ
(SIT w/ HMI Ded dummy)*(Highest State Marginal Rate)	SITWHMI	NY,ACIR

Table 20 State Variables (Continued)

Table 20 Data Source Abbreviations

Acronym	Description (Source)
ACIR	State marginal tax rates were obtained from the Advisory Council on Intergovernmental Relations (ACIR 1990, 1991).
CTJ	Citizens for Tax Justice (Tax Analysts 1995b)
FHFB	Federal Housing Finance Board (FHFB 1995)
MBA	Mortgage Bankers of America (MBA 1989)
NY	Data on local income tax was obtained primarily from New York Form IT-201 and Instructions (New York State Department of Taxation and Finance 1989).
PUMS	Public Use Microsample (U.S. Census Bureau 1990)
SS	State Statistics (U.S. Census Bureau 1999a)
SA	State Averages (U.S. Census Bureau 1999b)

Table 21. HUD Based Housing Discrimination Measure

City (SMA)	State	Whites Favored	State Average
Los Angeles-Long Beach	CA	57	38.0
Sacramento	CA	33	
San Bernardino-Riverside-Ontario	CA	33	
Stockton	CA	23	
Vallejo-Napa	CA	44	
Fort Lauderdale-Hollywood	FL	64	49.0
Tampa-St. Petersburg	FL	34	
Peoria	IL	53	53.0
Cincinnati	KY	57	43.3
Lexington	KY	31	
Louisville	KY	42	
Albany-Schenectady-Troy	NY	3	13.0
New York	NY	23	
Dallas	TX	63	43.0
Fort Worth	TX	23	
National Average		43	43.0

Table 22. Factor Analyzed State Characteristics

Variable	Mean	*SD*	Minimum	Maximum	Cases	Skew.	Kurt.
Personal Characteristics:							
AGE64	12.775	2.65	10.00	18.20	16000	0.83	2.66
MALE	48.827	0.66	47.95	50.06	16000	0.59	2.12
BLKHH	8.587	4.23	1.48	14.27	16000	-0.28	1.80
WHHH	85.251	7.22	75.83	97.41	16000	0.28	1.73
WHPOP	82.105	8.95	68.97	96.63	16000	0.20	1.78
Housing Market Characteristics & Economic Characteristics:							
PERINC	19113.500	2441.78	15106.00	23147.00	16000	0.00	2.07
BNKPOP	0.003	0.00	0.00	0.01	16000	0.72	2.76
MEDRNT	370.125	92.86	250.00	561.00	16000	0.64	2.85
MEDVAL	90475.000	46893.28	45900.00	195500.00	16000	1.26	3.41
METRO	78.075	19.24	43.20	96.80	16000	-0.98	2.26
OWNHM	61.300	5.64	53.30	70.70	16000	0.02	1.95
PPSQMI	167.238	114.79	37.50	384.10	16000	0.55	2.09
PROPVAL	64825.156	87462.06	0.00	450000.00	16000	2.28	9.02
VACAN	9.977	3.34	6.75	15.83	16000	0.60	1.68
Housing Discrimination:							
DISCRIM	40.625	11.27	13.00	53.00	16000	-1.62	4.74
Mortgage Market Characteristics:							
ARLNS	37.875	9.45	15.00	46.00	16000	-1.57	4.45
EFINTRT	10.094	0.21	9.86	10.45	16000	0.42	1.74
FHALOAN	31.845	9.62	13.73	44.56	16000	-0.27	2.36
FORCLOA	1.094	0.53	0.34	2.04	16000	0.43	2.06
INITFEE	1.651	0.35	1.16	2.33	16000	0.53	2.50
KINRT	9.815	0.19	9.62	10.22	16000	1.01	3.08
LNPR	75.263	2.16	72.00	79.30	16000	0.37	2.38
MATYRS	27.050	1.62	24.60	29.80	16000	0.02	1.98
MORTG2	0.066	0.25	0.00	1.00	16000	3.48	13.12
PASDUA	4.353	0.88	2.91	6.11	16000	0.40	3.01
PURPRK	121.500	38.94	72.00	199.60	16000	0.61	2.67
VALOAN	17.556	6.58	4.53	24.70	16000	-0.78	2.36
Tax Characteristics:							
ASITW	1278.559	2517.02	0.00	58896.91	16000	10.63	175.88
LOCIT	131.756	871.05	0.00	29448.46	16000	21.30	599.28
PTAX	563.655	902.92	0.00	5000.00	16000	2.41	10.05
SITWHMI	5.000	4.27	0.00	11.00	16000	-0.01	1.46

Table 23. Factor Analyzed State Characteristic Correlations

	PTAX	PROPVAL	ASITW	MALE	WHPOP	VACAN	WHHH	BLKHH	MEDVAL	MEDRNT	METRO	AGE64	PERINC	OWNHM	PPSQMI
PTAX	1.000														
PROPVAL	0.698	1.000													
ASITW	0.317	0.353	1.000												
MALE	-0.047	0.145	-0.022	1.000											
WHPOP	-0.138	-0.239	-0.043	-0.362	1.000										
VACAN	-0.069	-0.081	-0.081	0.109	0.024	1.000									
WHHH	-0.143	-0.228	-0.042	-0.317	0.995	0.027	1.000								
BLKHH	0.135	0.083	0.006	-0.329	-0.694	0.088	-0.732	1.000							
MEDVAL	0.122	0.301	0.130	0.467	-0.760	-0.280	-0.724	0.230	1.000						
MEDRNT	0.126	0.292	0.099	0.482	-0.820	-0.042	-0.775	0.338	0.949	1.000					
METRO	0.140	0.214	0.039	0.344	-0.841	0.351	-0.826	0.613	0.666	0.835	1.000				
AGE64	-0.023	-0.092	0.009	-0.660	0.375	0.186	0.404	0.038	-0.303	-0.187	-0.185	1.000			
PERINC	0.224	0.237	0.117	0.051	-0.711	-0.162	-0.704	0.530	0.768	0.808	0.785	-0.095	1.000		
OWNHM	-0.147	-0.244	-0.096	-0.401	0.832	0.028	0.845	-0.462	-0.811	-0.778	-0.771	0.579	-0.754	1.000	
PPSQMI	0.165	0.165	0.111	-0.420	-0.582	-0.106	-0.586	0.757	0.535	0.578	0.584	0.346	0.763	-0.485	1.000
PASDUA	-0.083	-0.203	-0.160	-0.121	0.116	0.476	0.064	0.257	-0.701	-0.586	-0.140	-0.146	-0.532	0.281	-0.380
FORCLOA	-0.040	-0.153	-0.118	0.178	0.256	0.746	0.238	-0.152	-0.526	-0.344	0.092	-0.144	-0.260	0.163	-0.505
VALOAN	-0.210	-0.176	-0.118	0.373	0.582	0.467	0.595	-0.684	-0.567	-0.533	-0.459	-0.115	-0.826	0.510	-0.893
FHALOAN	-0.206	-0.167	-0.116	0.349	0.535	0.387	0.530	-0.540	-0.555	-0.545	-0.416	-0.277	-0.786	0.411	-0.842
KINRT	-0.092	-0.120	-0.044	-0.392	0.140	-0.215	0.079	0.280	-0.396	-0.520	-0.437	-0.113	-0.482	0.193	-0.050
INITFEE	0.052	0.014	-0.100	0.130	-0.624	0.454	-0.644	0.715	-0.011	0.196	0.587	-0.188	0.177	-0.295	0.192
EFINTRT	-0.070	-0.111	-0.073	-0.334	-0.041	-0.080	-0.104	0.463	-0.386	-0.441	-0.250	-0.158	-0.403	0.110	-0.001
MATYRS	0.093	0.234	0.079	0.502	-0.709	0.286	-0.668	0.199	0.786	0.867	0.785	-0.138	0.637	-0.727	0.415
PURPRK	0.138	0.290	0.100	0.563	-0.854	-0.114	-0.829	0.318	0.953	0.948	0.802	-0.461	0.799	-0.913	0.468
LNPR	-0.155	-0.119	-0.114	0.361	0.193	0.186	0.205	-0.414	-0.373	-0.378	-0.409	-0.179	-0.708	0.359	-0.706
ARLNS	0.003	0.118	0.131	-0.179	0.114	-0.255	0.155	-0.127	0.406	0.339	0.027	0.437	0.279	-0.019	0.449
DISCRIM	-0.147	-0.120	-0.144	0.254	0.328	0.240	0.367	-0.277	-0.458	-0.300	-0.207	0.144	-0.535	0.625	-0.542
LOCIT	0.241	0.194	0.631	-0.201	-0.130	-0.084	-0.150	0.203	0.133	0.094	0.108	0.013	0.250	-0.215	0.286
MORTG2	0.216	0.230	0.119	0.045	-0.039	-0.011	-0.033	-0.005	0.082	0.079	0.051	-0.011	0.054	-0.054	0.037
BNKPOP	-0.093	0.018	-0.027	0.606	0.167	0.173	0.178	-0.417	0.038	0.031	0.052	-0.516	-0.167	-0.101	-0.506
SITWHMI	0.024	0.122	0.139	0.163	0.095	-0.606	0.119	-0.522	0.474	0.224	-0.274	-0.143	0.148	-0.192	-0.013

Table 23. Factor Analyzed State Characteristics (Continued)

	PASDUA	FORCLOA	VALOAN	FHALOAN	KINRT	INITFEE	EFINTRT	MATYRS	PURPRK	LNPR	ARLNS	DISCRIM	LOCIT	MORTG2	BNKPOP
PASDUA	1.000														
FORCLOA	0.618	1.000													
VALOAN	0.444	0.594	1.000												
FHALOAN	0.513	0.564	0.917	1.000											
KINRT	0.510	-0.240	0.039	0.266	1.000										
INITFEE	0.647	0.365	-0.104	-0.076	0.093	1.000									
EFINTRT	0.669	-0.113	0.007	0.225	0.957	0.377	1.000								
MATYRS	-0.423	-0.071	-0.266	-0.418	-0.628	0.250	-0.530	1.000							
PURPRK	-0.505	-0.284	-0.504	-0.478	-0.433	0.209	-0.356	0.838	1.000						
LNPR	0.473	0.256	0.714	0.507	0.130	0.176	0.176	-0.087	-0.319	1.000					
ARLNS	-0.781	-0.581	-0.334	-0.271	-0.144	-0.647	-0.334	0.116	0.169	-0.627	1.000				
DISCRIM	0.381	0.363	0.583	0.598	0.004	0.169	0.066	-0.387	-0.433	0.364	-0.158	1.000			
LOCIT	-0.109	-0.126	-0.300	-0.285	0.020	-0.014	0.012	0.098	0.129	-0.228	0.066	-0.371	1.000		
MORTG2	-0.077	-0.041	-0.029	-0.021	-0.040	-0.030	-0.048	0.059	0.072	-0.050	0.074	-0.017	0.051	1.000	
BNKPOP	0.007	0.372	0.494	0.703	-0.071	-0.188	-0.126	-0.071	0.110	-0.061	0.113	0.390	-0.197	0.041	1.000
SITWHMI	-0.784	-0.579	-0.149	-0.254	-0.221	-0.772	-0.435	0.212	0.294	-0.041	0.452	-0.519	0.106	0.043	-0.029

Table 24. Factor Analysis Total Variance Explained

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative%**
1	10.775	34.757	34.757	9.325	30.081	30.081
2	5.103	16.461	51.218	4.246	13.696	43.776
3	4.502	14.523	65.741	3.831	12.357	56.133
4	2.525	8.144	73.885	3.631	11.712	67.845
5	2.079	6.706	80.591	2.914	9.401	77.246
6	1.545	4.984	85.575	1.957	6.314	83.560
7	1.285	4.145	89.720	1.910	6.160	89.720
8	.994	3.205	92.925			
9	.887	2.862	95.787			
10	.756	2.439	98.226			
11	.299	.964	99.190			
12	.251	.810	100.000			
13	1.684E-14	5.432E-14	100.000			
14	1.503E-14	4.849E-14	100.000			
15	9.436E-15	3.044E-14	100.000			
16	8.475E-15	2.734E-14	100.000			
17	7.555E-15	2.437E-14	100.000			
18	7.256E-15	2.341E-14	100.000			
19	3.939E-15	1.271E-14	100.000			
20	2.524E-15	8.141E-15	100.000			
21	7.872E-16	2.539E-15	100.000			
22	-1.338E-16	-4.316E-16	100.000			
23	-9.379E-16	-3.025E-15	100.000			
24	-2.736E-15	-8.827E-15	100.000			
25	-3.047E-15	-9.829E-15	100.000			
26	-4.428E-15	-1.428E-14	100.000			
27	-6.101E-15	-1.968E-14	100.000			
28	-7.225E-15	-2.331E-14	100.000			
29	-8.750E-15	-2.823E-14	100.000			
30	-1.144E-14	-3.690E-14	100.000			
31	-1.188E-14	-3.834E-14	100.000			

Table 25. Factor Analysis Rotated Component Matrix

	Component						
	1	**2**	**3**	**4**	**5**	**6**	**7**
WHPOP	**-0.966**	-0.059	0.143	0.117	0.073	0.025	-0.103
WHHH	**-0.960**	-0.074	0.148	0.183	0.077	-0.018	-0.080
PURPRK	**0.938**	-0.194	0.125	0.228	0.064	0.061	0.083
OWNHM	**-0.923**	0.087	-0.142	0.009	-0.057	-0.263	0.027
MEDRNT	**0.875**	-0.136	-0.012	0.343	0.201	-0.074	0.147
METRO	**0.870**	0.387	-0.034	0.190	0.219	0.004	0.079
MEDVAL	**0.838**	-0.414	0.043	0.256	0.169	0.011	0.116
PERINC	**0.777**	-0.069	-0.257	0.230	0.395	0.191	0.045
MATYRS	**0.773**	0.040	-0.057	0.547	-0.090	0.041	0.045
BLKHH	**0.577**	0.355	-0.482	-0.503	0.223	0.055	0.033
SITWHMI	0.028	**-0.897**	0.076	0.353	-0.056	0.195	-0.035
VACAN	-0.019	**0.847**	0.109	0.273	-0.047	-0.019	-0.072
FORCLOA	-0.206	**0.801**	0.344	0.200	-0.208	0.092	-0.129
INITFEE	0.495	**0.705**	-0.183	-0.321	-0.300	-0.119	0.044
PASDUA	-0.234	**0.687**	0.059	-0.541	-0.405	-0.033	-0.089
BNKPOP	-0.015	0.096	**0.961**	0.051	0.230	-0.088	0.023
FHALOAN	-0.495	0.282	**0.748**	-0.122	-0.211	-0.148	-0.047
MALE	0.452	-0.038	**0.693**	0.307	-0.367	-0.208	0.103
AGE64	-0.468	0.137	**-0.666**	0.281	0.367	-0.161	0.055
PPSQMI	0.539	-0.045	**-0.622**	-0.068	0.529	0.114	0.052
VALOAN	-0.554	0.271	**0.569**	0.161	-0.429	-0.168	-0.051
EFINTRT	-0.104	0.117	-0.058	**-0.957**	-0.120	-0.026	-0.034
KINRT	-0.253	-0.094	0.001	**-0.925**	-0.029	0.013	-0.051
LNPR	-0.276	0.063	0.133	0.009	**-0.896**	-0.201	-0.014
ARLNS	-0.038	-0.461	-0.032	0.265	**0.773**	-0.073	0.103
LOCIT	0.086	-0.009	-0.145	-0.033	0.085	**0.837**	0.114
ASITW	-0.012	-0.046	0.032	0.062	0.055	**0.696**	0.380
DISCRIM	-0.405	0.390	0.315	-0.003	-0.055	**-0.545**	0.182
PROPVAL	0.199	-0.083	0.019	0.055	-0.004	0.171	**0.832**
PTAX	0.080	0.024	-0.114	0.012	-0.009	0.273	**0.787**
MORTG2	0.016	-0.029	0.042	0.014	0.054	-0.047	**0.517**

Table 26. Descriptive Statistics for Factor Scores by State

Score	Statistic	CA	CO	FL	IA	IL	KY	NY	TX
1	Mean	1.5856	-0.1394	-0.2885	-1.6461	0.2039	-1.1755	0.9639	0.4962
	Median	1.6217	-0.1240	-0.2629	-1.6299	0.2249	-1.1562	1.0208	0.5163
	Std. Dev.	0.1093	0.0631	0.0648	0.0620	0.0736	0.0517	0.1996	0.0509
	Minimum	0.6396	-0.5661	-0.7962	-2.1969	-0.3111	-1.6352	-1.2170	0.2042
	Maximum	1.6728	-0.0781	-0.2336	-1.5935	0.2675	-1.1349	1.0984	0.5354
	Range	1.0332	0.4880	0.5626	0.6034	0.5786	0.5003	2.3155	0.3312
	Skewness	-3.3550	-1.8770	-2.1540	-3.2530	-2.3420	-2.7090	-5.6550	-1.9620
	Kurtosis	19.5950	5.7370	6.7470	17.6080	8.4220	12.4020	47.9980	4.5580
2	Mean	-1.3755	0.7242	1.4116	-1.0136	0.3651	-0.7845	-0.5376	1.2102
	Median	-1.3908	0.7154	1.4019	-1.0211	0.3556	-0.7913	-0.5832	1.2026
	Std. Dev.	0.0617	0.0299	0.0350	0.0399	0.0348	0.0275	0.2251	0.0226
	Minimum	-1.4499	0.6665	1.3570	-1.0756	0.2922	-0.8247	-0.7082	1.1536
	Maximum	-0.7166	1.0242	1.7463	-0.5944	0.6426	-0.4836	2.2520	1.3419
	Range	0.7334	0.3577	0.3893	0.4812	0.3504	0.3412	2.9602	0.1883
	Skewness	7.0590	3.5980	3.2740	5.7410	3.2210	3.8920	7.9510	1.8420
	Kurtosis	65.7330	25.4900	15.2760	49.4640	16.3720	29.8860	80.4800	4.5900
3	Mean	0.6054	1.9290	-0.9529	-0.7932	-0.1905	0.7739	-1.3002	-0.0715
	Median	0.5926	1.9266	-0.9597	-0.7996	-0.1861	0.7669	-1.3300	-0.0666
	Std. Dev.	0.0762	0.0345	0.0495	0.0533	0.0410	0.0355	0.1662	0.0276
	Minimum	0.3935	1.8173	-1.1590	-0.9602	-0.3609	0.6772	-1.5412	-0.2546
	Maximum	1.5250	2.3087	-0.5156	-0.2108	0.0987	1.1633	0.7426	0.0783
	Range	1.1315	0.4914	0.6434	0.7495	0.4595	0.4861	2.2838	0.3329
	Skewness	6.9950	3.7320	2.6130	6.8650	1.5620	3.1230	8.5030	-1.6840
	Kurtosis	67.8980	33.2020	15.2790	68.8080	11.0770	20.7790	89.8220	6.8570
4	Mean	0.7634	0.9606	0.9445	1.0838	-1.1237	-1.5881	-0.3054	-0.7352
	Median	0.7785	0.9687	0.9516	1.0877	-1.1165	-1.5826	-0.3044	-0.7296
	Std. Dev.	0.0453	0.0290	0.0313	0.0230	0.0282	0.0240	0.0518	0.0196
	Minimum	0.5996	0.8110	0.7780	0.9693	-1.2888	-1.7234	-0.4771	-0.8715
	Maximum	1.0086	1.0839	1.0767	1.2509	-1.0290	-1.4812	0.2876	-0.7003
	Range	0.4090	0.2729	0.2988	0.2815	0.2599	0.2422	0.7648	0.1713
	Skewness	-0.7580	-2.1870	-1.7900	-0.4190	-2.3230	-2.6780	5.3600	-3.2580
	Kurtosis	2.5410	5.0540	5.0060	18.2980	7.1140	8.2600	54.2260	12.1320
5	Mean	-0.2947	0.4957	0.9405	-0.8905	0.8351	0.3877	0.6794	-2.1531
	Median	-0.2524	0.5100	0.9642	-0.8757	0.8556	0.3973	0.7200	-2.1255
	Std. Dev.	0.0977	0.0600	0.0678	0.0477	0.0789	0.0386	0.1128	0.0646
	Minimum	-0.6865	0.0895	0.5295	-1.3057	0.4400	-0.0028	0.1084	-2.5632
	Maximum	-0.1460	0.6130	1.0623	-0.7806	0.9735	0.4848	0.8438	-2.0337
	Range	0.5405	0.5235	0.5328	0.5250	0.5335	0.4876	0.7354	0.5294
	Skewness	-1.4480	-1.7130	-2.5060	-2.0390	-1.8060	-2.7670	-1.5690	-2.2850
	Kurtosis	1.8170	4.8570	9.1060	8.5300	4.1890	16.5000	2.4260	7.0890

Table 27. Detailed Hierarchical Model Specification

Personal Characteristics:

- Age of householder or spouse
- Sex of householder
- Race of householder or spouse = nonwhite
- Classifier Income
- Education
- Occupation
- Marital Status
- Dependents

Factored State Characteristics (see Table 20 for full detail):

- Personal Characteristics
- Housing Demographics & Economic Characteristics
- Mortgage Market Characteristics
- Tax Characteristics

State Dummies

Table 28. Census Based Regression Results

Table 28.a. Ridge Regression Results

Table 28.a.1. Ridge Regression Results - Model 1 (Constant only)

Table 28.a.2. Ridge Regression Results - Model 2

Dependent variable: HMIB
Mult R =.7309054, R^2 =.5342228, Adj R^2=.5336690, SE = 483.68461

	df	**SS**	**MS**
Regress	19.000	4.288E+09	225679359
Residual	15980.000	3.739E+09	233950.80

F-value =964.6445202, Sig F =.0000000

Variable	**B**	**SE(B)**	**Beta**	**B/SE(B)**
AGE	-.3813913	.1386856	-.0095589	-2.7500431*
AGE2	-.0134080	.0012339	-.0357208	-10.8660195*
SEX	-12.3937896	7.1257088	-.0085277	-1.7393062
DRACEW	-11.3888329	10.5690325	-.0054537	-1.0775663
DRACEO	-14.6429466	13.9228775	-.0052945	-1.0517184
MARSTAT	-7.8556946	7.2174391	-.0054173	-1.0884324
DEPEXEM	33.8654537	2.8447584	.0572308	11.9045096*
CLASSINC	.0133612	.0001132	.5839091	118.0024661*
HSCH	-49.3899108	7.5474136	-.0314032	-6.5439518*
SOMECOLL	-9.8967134	8.3572539	-.0056416	-1.1842064
COLL	22.1742690	8.9240179	.0120556	2.4847853
ADVCOLL	110.5125433	12.7736065	.0416737	8.6516320*
SERVICE	-10.0437074	11.1740335	-.0041592	-.8988435

OPERLABR	-78.0163321	9.8837796	-.0370816	-7.8933703*
FARMFISH	-99.7491004	18.6424109	-.0244803	-5.3506545*
PRECTRAD	-67.3983083	10.4564889	-.0302857	-6.4455965*
MILITARY	-153.3219813	65.2538861	-.0106744	-2.3496222
TECHSALE	-11.7579620	8.0894430	-.0068514	-1.4534946
PROFEXEC	31.3558470	8.4478975	.0181489	3.7116746*
Constant	-93.1491299	16.5822958	.0000000	-5.6173844*

* indicates significance at the .01 level

Table 28.a.3. Ridge Regression Results - Model 3

Dependent variable: HMIB

Mult R =.7424749, R^2 =.5512690, Adj R^2 =.5505949, SE =474.82557

	df	SS	MS
Regress	24.000	4.425E+09	184363701
Residual	15975.000	3.602E+09	225459.33

F-value =817.7248676, Sig F =.0000000

Variable	B	SE(B)	Beta	B/SE(B)
AGE	-.2806264	.1362666	-.0070334	-2.0593929
AGE2	-.0123418	.0012121	-.0328804	-10.1818497*
SEX	-9.2713666	6.9956325	-.0063793	-1.3253078
DRACEW	32.2747554	10.4255703	.0154553	3.0957305*
DRACEO	25.6503052	13.6694516	.0092744	1.8764692
MARSTAT	-.3614093	7.0914864	-.0002492	-.0509638
DEPEXEM	34.5623173	2.7938030	.0584084	12.3710644*
CLASSINC	.0132623	.0001112	.5795854	119.2395883*
HSCH	-44.3058537	7.4145511	-.0281706	-5.9755275*
SOMECOLL	-19.6028798	8.2095168	-.0111745	-2.3878238
COLL	15.9741280	8.7630499	.0086847	1.8228959
ADVCOLL	104.6383882	12.5405036	.0394586	8.3440340*
SERVICE	-8.7935075	10.9698200	-.0036415	-.8016091
OPERLABR	-72.9054963	9.7092039	-.0346524	-7.5089057*
FARMFISH	-94.5416046	18.3279111	-.0232023	-5.1583404*
PRECTRAD	-65.3634890	10.2654435	-.0293714	-6.3673322*
MILITARY	-190.2947389	64.0756354	-.0132485	-2.9698455*

TECHSALE	-15.9944126	7.9448360	-.0093201	-2.0131835
PROFEXEC	29.0811113	8.2951640	.0168323	3.5057910*
FAC1ST	51.7848803	3.1995869	.0731119	16.1848646*
FAC2ST	-25.8919892	3.1613287	-.0365553	-8.1902237*
FAC3ST	51.2101429	3.1664885	.0723004	16.1725339*
FAC4ST	28.2550811	3.1633134	.0398916	8.9321156*
FAC5ST	-2.4823302	3.1598326	-.0035046	-.7855892
Constant	-142.5091023	16.3228143	.0000000	-8.7306698*

* indicates significance at the .01 level

Table 28.a.4. Ridge Regression Results - Model 4

Table 28.a.4.A. Ridge Regression Results - Model 4 (Five Factor Scores)

Dependent variable: HMIB
Mult R =.7463732, R^2 =.5570729, Adj R^2 =.5562130, SE =471.84828

	df	**SS**	**MS**
Regress	31.000	4.471E+09	144235913
Residual	15968.000	3.555E+09	222640.80

F-value =647.8413265, Sig F =.0000000

Variable	**B**	**SE(B)**	**Beta**	**B/SE(B)**
AGE	-.3084407	.1353885	-.0077305	-2.2781897
AGE2	-.0124553	.0012047	-.0331826	-10.3392966*
SEX	-7.6962995	6.9525920	-.0052955	-1.1069684
DRACEW	43.0785353	10.3888130	.0206289	4.1466273*
DRACEO	32.8363857	13.5944345	.0118727	2.4154286
MARSTAT	.5543396	7.0476792	.0003823	.0786556
DEPEXEM	34.9331046	2.7767906	.0590350	12.5803884*
CLASSINC	.0130875	.0001103	.5719468	118.6040094*
HSCH	-41.9888127	7.3729595	-.0266974	-5.6949740*
SOMECOLL	-21.9044544	8.1602509	-.0124865	-2.6842869*
COLL	14.5282462	8.7092049	.0078986	1.6681484
ADVCOLL	103.3918052	12.4621427	.0389885	8.2964710*
SERVICE	-7.1534828	10.9015373	-.0029623	-.6561903
OPERLABR	-71.0783152	9.6516810	-.0337839	-7.3643457*
FARMFISH	-92.3213739	18.2223047	-.0226574	-5.0663939*
PRECTRAD	-64.6302203	10.2012911	-.0290419	-6.3354942*

MILITARY	-193.1491018	63.6763796	-.0134473	-3.0332928*
TECHSALE	-17.0790261	7.8960097	-.0099521	-2.1629946
PROFEXEC	29.0376077	8.2442758	.0168071	3.5221538*
FAC1ST	-2.4433973	1.7928626	-.0034497	-1.3628470
FAC2ST	-1.3116976	1.8664273	-.0018519	-.7027853
FAC3ST	34.3106065	2.5372229	.0484410	13.5228982*
FAC4ST	8.2662677	1.8948492	.0116706	4.3624937*
FAC5ST	-22.5322490	1.7888627	-.0318119	-12.5958518*
STIA	-103.2453867	5.5035396	-.0482090	-18.7598152*
STKY	-60.2479291	6.3957252	-.0281319	-9.4200310*
STTX	-83.4772637	5.2403197	-.0389786	-15.9298036*
STFL	-3.0187935	7.0316825	-.0014096	-.4293131
STNY	1.9282922	7.2199719	.0009004	.2670775
STIL	3.2050330	7.6901112	.0014965	.4167733
STCA	202.9255418	6.9589935	.0947533	29.1601857*
Constant	-141.5081935	16.2855390	.0000000	-8.6891931*

* indicates significance at the .01 level

Table 28.a.4.B. Ridge Regression Results - Model 4 (Seven Factor Scores)

Dependent variable: HMIB
Mult R =.7772424, R^2 =.6041058, Adj R^2 =.6032875, SE =446.12139

	df	SS	MS
Regress	33.000	4.849E+09	146933931
Residual	15966.000	3.178E+09	199024.30

F-value =738.2713245, Sig F =.0000000

Variable	B	SE(B)	Beta	B/SE(B)
AGE	-1.4223082	.1275694	-.0356475	-11.1492894*
AGE2	-.0141356	.0011409	-.0376592	-12.3894718*
SEX	-.5444363	6.5759518	-.0003746	-.0827920
DRACEW	17.0379022	9.8286157	.0081589	1.7334997
DRACEO	38.9809054	12.8541581	.0140944	3.0325522*
MARSTAT	-30.4079002	6.6926978	-.0209695	-4.5434444*
DEPEXEM	27.5932185	2.6263577	.0466310	10.5062682*
CLASSINC	.0104777	.0001103	.4578955	94.9707414*
HSCH	-49.5499248	6.9691853	-.0315049	-7.1098590*
SOMECOLL	-40.1681365	7.7149803	-.0228976	-5.2065119*
COLL	-19.4806589	8.2443291	-.0105911	-2.3629162
ADVCOLL	51.7723781	11.8126008	.0195231	4.3828094*
SERVICE	-5.6371620	10.3075073	-.0023344	-.5468987
OPERLABR	-60.2391613	9.1290794	-.0286320	-6.5986019*
FARMFISH	-91.9004526	17.2289094	-.0225541	-5.3340842*
PRECTRAD	-60.6664695	9.6453990	-.0272607	-6.2896796*
MILITARY	-152.1890751	60.2089642	-.0105956	-2.5276813

TECHSALE	-35.7014783	7.4693035	-.0208035	-4.7797600*
PROFEXEC	2.2301138	7.8089631	.0012908	.2855839
FAC1ST	19.3994012	1.5686817	.0273888	12.3666904*
FAC2ST	-6.2988842	1.6630681	-.0088930	-3.7875084*
FAC3ST	43.2779842	2.3836878	.0611015	18.1558944*
FAC4ST	20.6081685	1.7784523	.0290954	11.5876981*
FAC5ST	-3.4947681	1.6375254	-.0049340	-2.1341764
FAC6ST	27.5079010	3.2617108	.0388367	8.4335807*
FAC7ST	188.7348741	3.2837943	.2664631	57.4746333*
STIA	-66.9855375	5.1302039	-.0312780	-13.0570906*
STKY	-42.2417159	6.0469552	-.0197242	-6.9856175*
STTX	-25.9581289	4.8235156	-.0121208	-5.3815787*
STFL	-40.8980783	6.7844570	-.0190968	-6.0282022*
STNY	20.2063938	6.8393701	.0094351	2.9544232*
STIL	-55.7260366	7.5290861	-.0260205	-7.4014344*
STCA	100.4336503	6.8869917	.0468961	14.5830944*
Constant	77.7520344	15.6310411	.0000000	4.9742070*

* indicates significance at the .01 level

Table 28.b. OLS Regression Results

Table 28.b.1. OLS Regression Results - Model 1

Dependent variable: HMIB

Model size: N = 16000, Parameters = 1, Df= 15999

Residuals: SS= 8990377092. , SD= 749.62236

Fit: R^2= -.120095, Adjusted R^2 = -.12009

Variable	Coefficient	SE	B/SE	P[|Z|>z]
Constant	508.5908068	5.9262851	85.819	.0000

Table 28.b.2. OLS Regression Results - Model 2

Dependent variable: HMIB

Model size: N = 16000, Parameters = 20, Df= 15980

Residuals: SS= 3578150391. , SD= 473.19583

Fit: R^2= .554205, Adjusted R^2 = .55367

Model test: F[19, 15980] = 1045.58, P-value = .00000

Variable	Coefficient	SE	B/SE	P[|Z|>z]
Constant	-112.0847650	36.716156	-3.053	.0023
AGE	4.635489705	1.3807437	3.357	.0008
AGE2	-.7488905671E-01	.13573977E-01	-5.517	.0000
SEX	-5.614456451	9.2752973	-.605	.5450
DRACEW	-26.51798367	15.973282	-1.660	.0969
DRACEO	-31.36706998	20.778295	-1.510	.1311
MARSTAT	-96.85200286	9.8232467	-9.859	.0000
DEPEXEM	34.80468861	3.5605451	9.775	.0000
CLASSINC	.1723031175E-01	.15234265E-03	113.102	.0000
HSCH	-75.55252223	10.745431	-7.031	.0000
SOMECOLL	-47.06932042	12.100839	-3.890	.0001
COLL	-42.24593259	13.521303	-3.124	.0018
ADVCOLL	9.936684927	18.164282	.547	.5843
SERVICE	-77.47757509	16.721775	-4.633	.0000
OPERLABR	-170.8649826	16.365558	-10.441	.0000
FARMFISH	-174.0984646	24.117344	-7.219	.0000
PRECTRAD	-168.2760424	17.148126	-9.813	.0000

MILITARY	-235.4824584	77.173082	-3.051	.0023
TECHSALE	-117.7064186	14.956763	-7.870	.0000
PROFEXEC	-98.43583536	16.150519	-6.095	.0000

Table 28.b.3. OLS Regression Results - Model 3

Dependent variable: HMIB

Model size: N = 16000, Parameters = 25, Df= 15975

Residuals: SS= 3440882480. , SD= 464.10312

Fit: R^2= .571307, Adjusted R^2 = .57066

Model test: F[24, 15975] = 887.06, P-value = .00000

Variable	**Coefficient**	**SE**	**B/SE**	**P[|Z|>z]**
Constant	-193.2546275	36.204160	-5.338	.0000
AGE	4.610331083	1.3545824	3.404	.0007
AGE2	-.7243053056E-01	.13319960E-01	-5.438	.0000
SEX	-.7032201968	9.1026387	-.077	.9384
DRACEW	52.77259634	16.146737	3.268	.0011
DRACEO	53.26259376	20.690816	2.574	.0100
MARSTAT	-85.08488727	9.6688076	-8.800	.0000
DEPEXEM	36.33504753	3.4954347	10.395	.0000
CLASSINC	.1708800067E-01	.14972670E-03	114.128	.0000
HSCH	-72.67988395	10.565893	-6.879	.0000
SOMECOLL	-63.27014233	11.912819	-5.311	.0000
COLL	-53.41353949	13.301620	-4.016	.0001
ADVCOLL	-.9896987671E-01	17.834959	-.006	.9956
SERVICE	-75.16784069	16.412181	-4.580	.0000
OPERLABR	-163.9621119	16.066108	-10.205	.0000
FARMFISH	-169.0077880	23.745785	-7.117	.0000

PRECTRAD	-164.8926211	16.826168	-9.800	.0000
MILITARY	-286.6615067	75.738231	-3.785	.0002
TECHSALE	-122.0857541	14.680502	-8.316	.0000
PROFEXEC	-99.28246776	15.846124	-6.265	.0000
FAC1st	56.58589582	3.8203869	14.812	.0000
FAC2st	-33.55406207	3.6912744	-9.090	.0000
FAC3st	59.61636837	3.7021266	16.103	.0000
FAC4st	34.42809928	3.7065112	9.289	.0000
FAC5st	-4.909643885	3.6880426	-1.331	.1831

Table 28.b.4. OLS Regression Results - Model 4

Dependent variable: HMIB

Model size: N = 16000, Parameters = 32, Df= 15968

Residuals: SS= 2997922954. , SD= 433.29629

Fit: R^2=.626494, Adjusted R^2 = .62577

Model test: F[31, 15968] = 863.99, P-value = .00000

Variable	**Coefficient**	**SE**	**B/SE**	**P[|Z|>z]**
Constant	252.5937601	188.02980	1.343	.1792
AGE	-4.028485589	1.2797560	-3.148	.0016
AGE2	-.5793040886E-02	.12530613E-01	-.462	.6439
SEX	5.633586799	8.5012139	.663	.5075
DRACEW	26.61333565	15.124251	1.760	.0785
DRACEO	54.51364702	19.342617	2.818	.0048
MARSTAT	-104.0196457	9.0640736	-11.476	.0000
DEPEXEM	28.32434069	3.2737734	8.652	.0000
CLASSINC	.1315407995E-01	.18545179E-03	70.930	.0000
HSCH	-88.01697323	9.9024929	-8.888	.0000
SOMECOLL	-95.63629213	11.174148	-8.559	.0000
COLL	-101.4537119	12.502234	-8.115	.0000
ADVCOLL	-58.42169666	16.744488	-3.489	.0005
SERVICE	-60.45299057	15.335894	-3.942	.0001
OPERLABR	-137.7111964	15.030328	-9.162	.0000
FARMFISH	-163.1961499	22.187687	-7.355	.0000
PRECTRAD	-146.5543422	15.726777	-9.319	.0000

MILITARY	-227.3678881	70.727388	-3.215	.0013
TECHSALE	-125.5496962	13.722160	-9.149	.0000
PROFEXEC	-102.9890866	14.822347	-6.948	.0000
FAC1st	-4300.727780	294.17769	-14.619	.0000
FAC2st	-4408.004200	245.14184	-17.981	.0000
FAC3st	927.7114948	154.39840	6.009	.0000
FAC4st	1302.328372	354.86715	3.670	.0002
FAC5st	-768.8241893	144.47945	-5.321	.0000
STIA	-13030.01332	983.41225	-13.250	.0000
STKY	-6958.488496	316.91508	-21.957	.0000
STTX	6755.434561	979.51546	6.897	.0000
STFL	5290.759380	503.55811	10.507	.0000
STNY	3822.375511	351.31089	10.880	.0000
STIL	4720.750630	605.16073	7.801	.0000
STCA	-768.2339668	195.10769	-3.937	.0001

Table 28.c. Tobit Regression Results
Table 28.c.1. Tobit Regression Results - Model 1

Dependent variable:		HMIB		
N	16000			
LL	-54696.83			
Variable	**Coefficient**	**SE**	**B/SE**	**P[|Z|>z]**
Constant	-659.4126958	17.466514	-37.753	.0000

Table 28.c.2. Tobit Regression Results - Model 2

Dependent variable:		HMIB		
N	16000			
LL	-49442.49			

Variable	**Coefficient**	**SE**	**B/SE**	**P[|Z|>z]**
Constant	-3319.593917	104.69804	-31.706	.0000
AGE	93.03977521	4.2049537	22.126	.0000
AGE2	-1.050775836	.44337517E-01	-23.699	.0000
SEX	-48.33514110	20.717725	-2.333	.0196
DRACEW	100.9921344	36.233979	2.787	.0053
DRACEO	-13.58395263	49.321907	-.275	.7830
MARSTAT	195.8568377	22.936792	8.539	.0000
DEPEXEM	64.24080253	7.4550604	8.617	.0000
CLASSINC	.2217452740E-01	.28472657E-03	77.880	.0000
HSCH	82.73642697	27.062789	3.057	.0022
SOMECOLL	211.9177683	28.902428	7.332	.0000
COLL	225.8752450	30.812232	7.331	.0000
ADVCOLL	230.6083638	38.552342	5.982	.0000
SERVICE	-4.607270419	46.937958	-.098	.9218
OPERLABR	-15.94574337	43.979932	-.363	.7169
FARMFISH	-332.9382797	66.484161	-5.008	.0000
PRECTRAD	31.93778044	44.374462	.720	.4717
MILITARY	-307.7000972	174.47635	-1.764	.0778
TECHSALE	75.58792518	41.248127	1.833	.0669

PROFEXEC	86.18040674	42.499809	2.028	.0426

Table 28.c.3. Tobit Regression Results - Model 3

Dependent variable: HMIB

N 16000

LL -49214.57

Variable	Coefficient	SE	B/SE	P[|Z|>z]
Constant	-3425.394211	102.03803	-33.570	.0000
AGE	91.84150878	4.0810848	22.504	.0000
AGE2	-1.037788243	.43111455E-01	-24.072	.0000
SEX	-41.65359678	20.002264	-2.082	.0373
DRACEW	248.1941514	35.978549	6.898	.0000
DRACEO	126.3184127	48.289048	2.616	.0089
MARSTAT	225.2738887	22.280871	10.111	.0000
DEPEXEM	68.07914185	7.1877876	9.472	.0000
CLASSINC	.2173329958E-01	.27477825E-03	79.094	.0000
HSCH	96.32243206	26.254375	3.669	.0002
SOMECOLL	182.3363940	28.015286	6.508	.0000
COLL	209.4443002	29.822798	7.023	.0000
ADVCOLL	217.8791420	37.232501	5.852	.0000
SERVICE	-2.942553999	45.650338	-.064	.9486
OPERLABR	5.708557287	42.795789	.133	.8939
FARMFISH	-312.7341275	64.789700	-4.827	.0000
PRECTRAD	37.48095348	43.133186	.869	.3849
MILITARY	-407.0136904	168.24527	-2.419	.0156
TECHSALE	62.59076689	40.125497	1.560	.1188

PROFEXEC	76.82311452	41.308302	1.860	.0629
FAC1st	126.8890324	8.4938137	14.939	.0000
FAC2st	-16.23960397	8.0048258	-2.029	.0425
FAC3st	91.54838961	7.8601544	11.647	.0000
FAC4st	73.78376440	8.2313792	8.964	.0000
FAC5st	17.81548354	8.1276843	2.192	.0284

Table 28.c.4. Tobit Regression Results - Model 4

Dependent variable: HMIB

N 16000

LL -47955.10

Variable	Coefficient	SE	B/SE	P[|Z|>z]
Constant	434.4899320	348.63716	1.246	.2127
AGE	64.74414160	3.7070601	17.465	.0000
AGE2	-.8168371409	.39205311E-01	-20.835	.0000
SEX	-19.83453744	18.090762	-1.096	.2729
DRACEW	194.4746275	33.093341	5.877	.0000
DRACEO	157.8347607	44.205665	3.570	.0004
MARSTAT	168.0613139	20.328719	8.267	.0000
DEPEXEM	47.80033562	6.4894993	7.366	.0000
CLASSINC	.1529186746E-01	.33565547E-03	45.558	.0000
HSCH	45.09037270	23.784989	1.896	.0580
SOMECOLL	78.66799547	25.378347	3.100	.0019
COLL	60.13670923	27.118394	2.218	.0266
ADVCOLL	54.65939401	33.785035	1.618	.1057
SERVICE	36.97244285	41.973969	.881	.3784
OPERLABR	62.50422460	39.347493	1.589	.1122
FARMFISH	-242.3132123	58.388445	-4.150	.0000
PRECTRAD	66.99971949	39.565070	1.693	.0904
MILITARY	-289.3229496	151.32781	-1.912	.0559
TECHSALE	31.88611775	36.937224	.863	.3880

PROFEXEC	52.61036221	37.938632	1.387	.1655
FAC1st	-4888.983404	526.61263	-9.284	.0000
FAC2st	-4950.048061	438.76278	-11.282	.0000
FAC3st	1408.642503	278.66081	5.055	.0000
FAC4st	-1226.739355	637.06969	-1.926	.0542
FAC5st	-2417.956253	258.80956	-9.343	.0000
STIA	-15791.65560	1751.3947	-9.017	.0000
STKY	-14617.44671	542.93397	-26.923	.0000
STTX	-418.9551939	1773.4644	-.236	.8132
STFL	7702.864760	915.43256	8.414	.0000
STNY	2244.567822	642.20664	3.495	.0005
STIL	935.9088970	1089.4762	.859	.3903
STCA	-1979.890884	343.95517	-5.756	.0000

Table 29. H4-H6 Results

Table 29.a. Census Hypothesis Test Results (Ridge)

Table 29.a.1. H4 Results (Ridge)

Model	**Model Description**	R^2
1	HMIBENE = F(Constant)	0
2	HMIBENE = F(Constant + Personal Characteristics)	.534222

F_{H4}= [(.534222-0)/(1-.534222)]*[(16,000-0-8-1)/(8)]=2,293

Table 29.a.2. H5 Results (Ridge)

Model	**Model Description**	R^2
2	HMIBENE = F(Constant + Personal Characteristics)	.534222
3	HMIBENE = F(Constant + Personal Characteristics + State Factor Scores)	.551269

F_{H5}= [(.551269-.534222)/(1-.551269)]*[(16,000-8-5-1)/(5)]=128

Table 29.a.3. H6 Results (Ridge)

Model	**Model Description**	R^2
3	HMIBENE =F(Constant + Personal Characteristics + State Factor Scores)	.551269
4	HMIBENE = F(Constant + Personal Characteristics + State Factor Scores + State of Residence)	.557073

F_{H6}= [(.557073-.551269)/(1-.557073)]*[(16,000-13-7-1)/(7)]=30

Table 29.a.4. Summary of Hypothesis Test Results (Ridge)

Hypothesis	F	$P[\|Z\|>z]$
4	2,293	0.0000
5	128	0.0000
6	30	0.0001

Table 29.b. Census Hypothesis Test Results (OLS)

Table 29.b.1. H4 Results (OLS)

Model	**Model Description**	R^2
1	HMIBENE = F(Constant)	0[7]
2	HMIBENE = F(Constant + Personal Characteristics)	.554205

F_{H4}= [(.554205-0)/(1-.554205)]*[(16,000-0-8-1)/(8)]=2,485

Table 29.b.2. H5 Results (OLS)

Model	**Model Description**	R^2
2	HMIBENE = F(Constant + Personal Characteristics)	.554205
3	HMIBENE = F(Constant + Personal Characteristics + State Factor Scores)	.571307

F_{H5}= [(.571307-.554205)/(1-.571307)]*[(16,000-8-5-1)/(5)]=127.547

Table 29.b.3. H6 Results (OLS)

Model	**Model Description**	R^2
3	HMIBENE =F(Constant + Personal Characteristics + State Factor Scores)	.571307
4	HMIBENE = F(Constant + Personal Characteristics + State Factor Scores + State of Residence)	.626494

F_{H6}= [(.626494-.571307)/(1-.626494)]*[(16,000-13-7-1)/(7)]=337.280

Table 29.b.4. Summary of Hypothesis Test Results (OLS)

Hypothesis	F	**P[|*Z*|>*z*]**
4	2,485	0.0000
5	128	0.0000
6	337	0.0000

[7]The actual value reported by Limdep is -.120095, yielding an F of 2,949. Either value indicates the same test result - highly significant.

Table 29.c. Census Hypothesis Test Results (Tobit)

Table 29.c.1. H4 Results (Tobit)

Model	**Model Description**	***LL***
1	HMIBENE = F(Constant[8])	-54,697
2	HMIBENE = F(Constant + Personal Characteristics)	-49,442

${}^{2}_{H4}$ = 2*[*LL*(2) - *LL*(1)] = 2*[-49,442 - (-54,697)] = 10,840

Table 29.c.2. H5 Results (Tobit)

Model	**Model Description**	***LL***
2	HMIBENE = F(Constant + Personal Characteristics)	-49,442
3	HMIBENE = F(Constant + Personal Characteristics + State Factor Scores)	-49,215

${}^{2}_{H5}$ = 2*[*LL*(3) - *LL*(2)] = 2*[-49,215 - (-49,442)] = 454

Table 29.c.3. H6 Results (Tobit)

Model	**Model Description**	***LL***
3	HMIBENE =F(Constant + Personal Characteristics + State Factor Scores)	-49,215
4	HMIBENE = F(Constant + Personal Characteristics + State Factor Scores + State of Residence)	-47,955

${}^{2}_{H6}$ = 2*[*LL*(4) - *LL*(3)] = 2*[-47,955 - (-49,215)] = 2,520

Table 29.c.4. Summary of Hypothesis Test Results (Tobit)

Hypothesis	^{2}	**P[|*Z*|>*z*]**
4	10,840	0.0000
5	454	0.0000
6	2,520	0.0000

[8]Constant equals one.

Table 30. State Dummy Coefficients and P-values (Ridge v. Tobit v. OLS)

	Ridge		Tobit		OLS	
	Coefficient	***P*[|*Z*|>*z*]**	**Coefficient**	***P*[|*Z*|>*z*]**	**Coefficient**	***P*[|*Z*|>*z*]**
STIA	-103.25	0.0000	-15791.66	0.0000	-13030.01	0.0000
STKY	-60.25	0.0000	-14617.45	0.0000	-6958.49	0.0000
STTX	-83.48	0.0000	-418.96	0.8132	6755.43	0.0000
STFL	-3.02	0.6677	7702.86	0.0000	5290.76	0.0000
STNY	1.93	0.7894	2244.57	0.0005	3822.38	0.0000
STIL	3.21	0.6768	935.91	0.3903	4720.75	0.0000
STCA	202.92	0.0000	-1979.89	0.0000	-768.23	0.0001

Table 31. Differences in Mean State Effects (Ridge, Corrected & Uncorrected)

State	Uncorrected Effects		Corrected Effects		Corrected v. Uncorrected Means
	Mean	**Difference**	**Mean**	**Difference**	
IA	83.97	-	165.14	-	81.17
KY	124.55	40.58	184.91	19.77	-3.76
TX	188.67	64.12	208.13	23.22	83.58
FL	199.77	11.10	265.36	57.23	65.59
NY	248.01	48.24	268.38	3.02	-97.91
IL	269.47	21.46	270.31	1.93	22.3
CO	366.29	96.82	271.59	1.28	2.12
CA	624.40	258.11	471.31	199.72	-153.09
Sum					.00

FIGURES

Figure 1. Ridge Trace of State Dummies

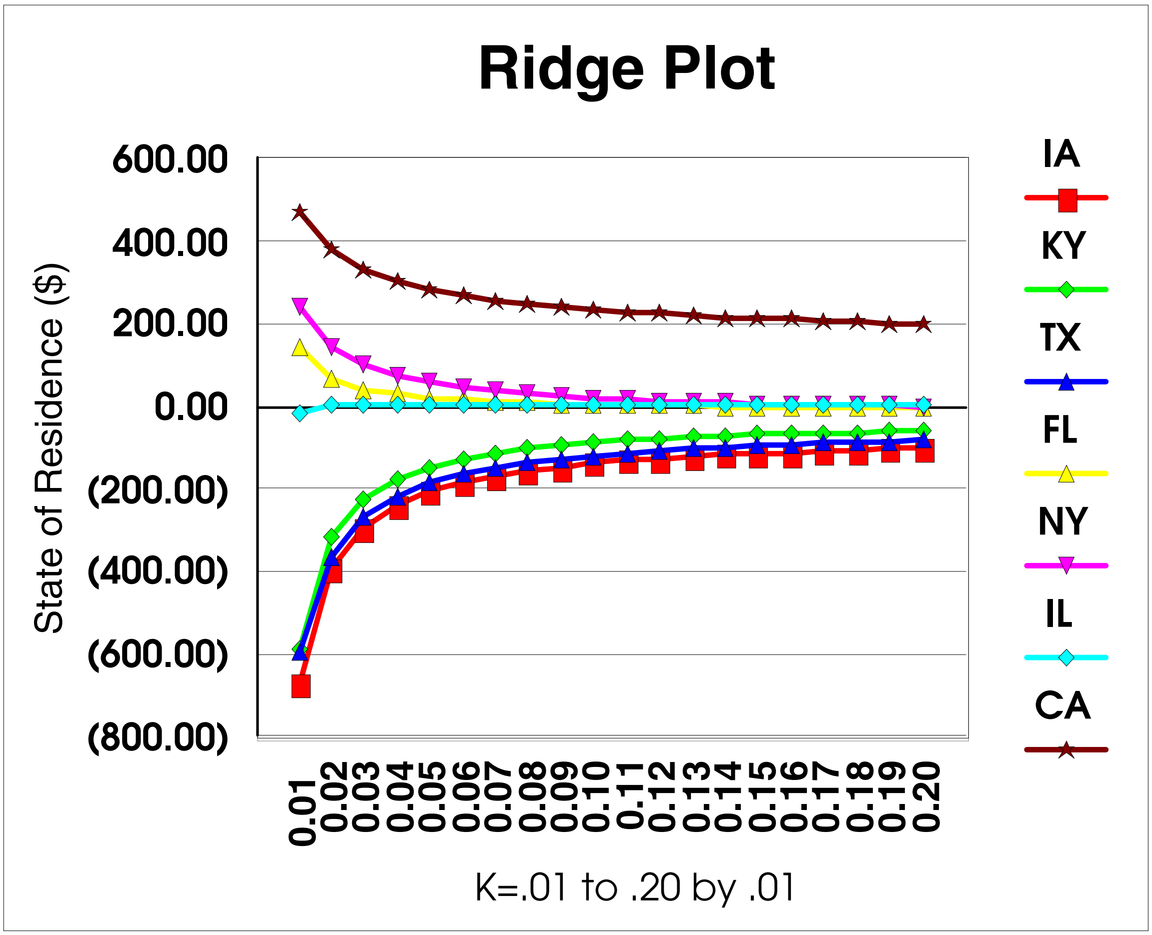

Figure 2. Scree Plot for State Characteristic Factor Analysis